THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. XCI. No. 2203.] LONDON, AUGUST 1, 1905. [57TH YEAR. PRICE 6d.

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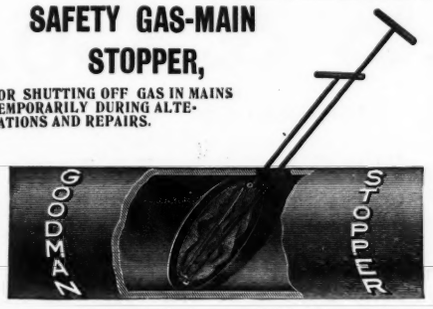

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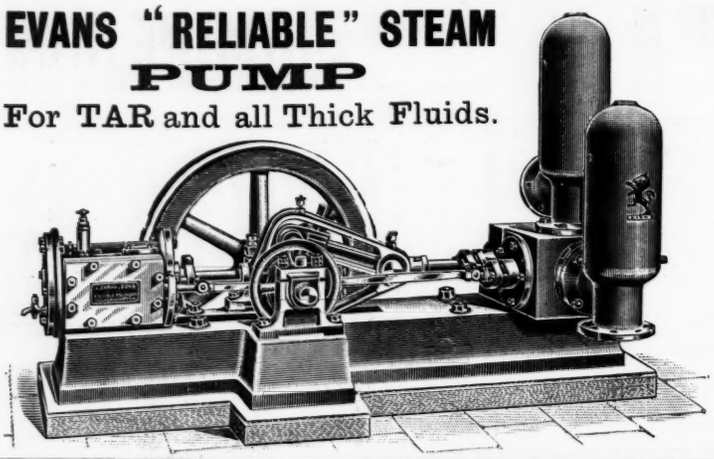

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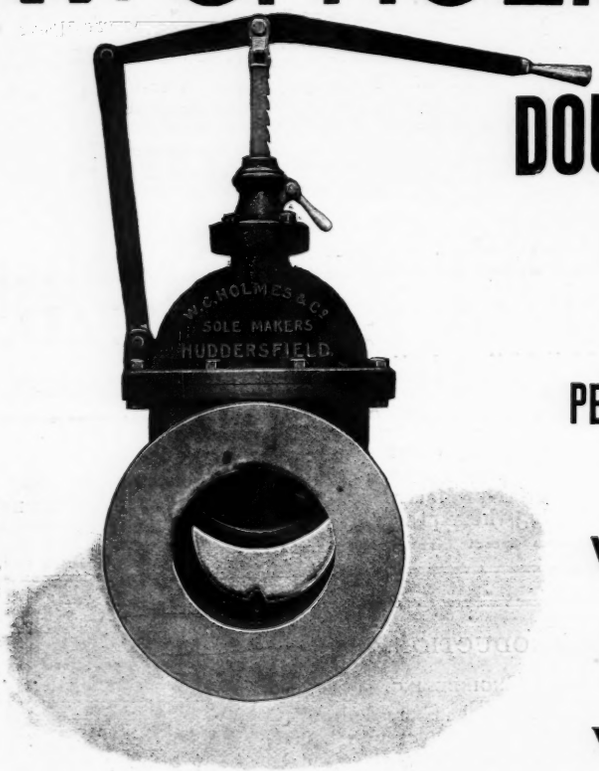

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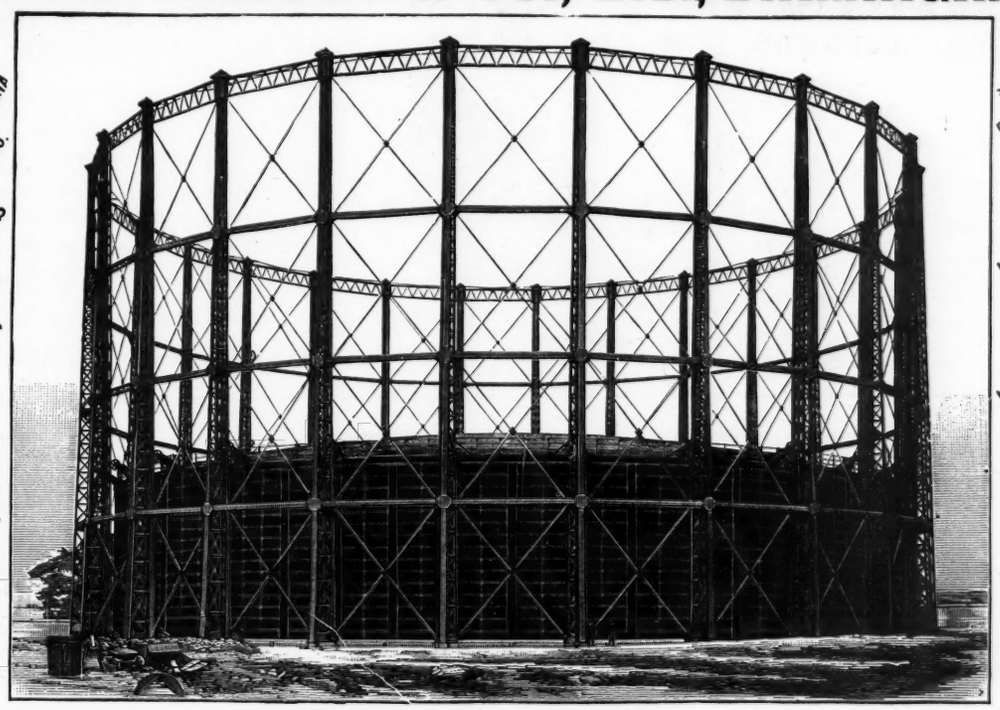

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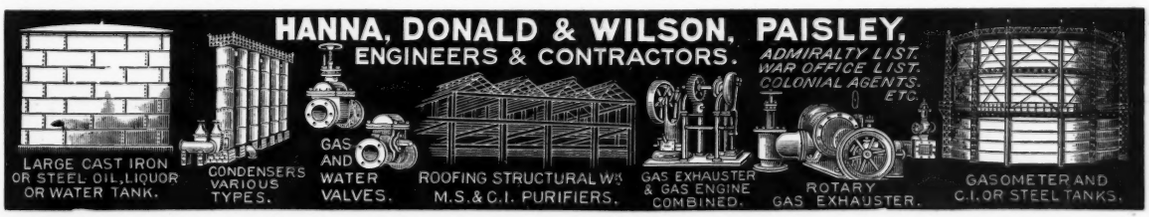
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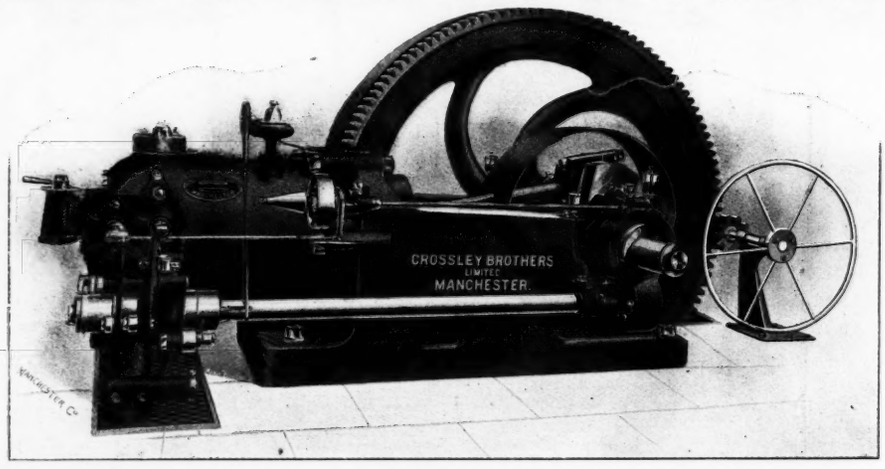

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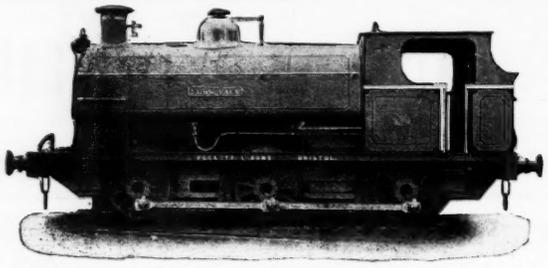

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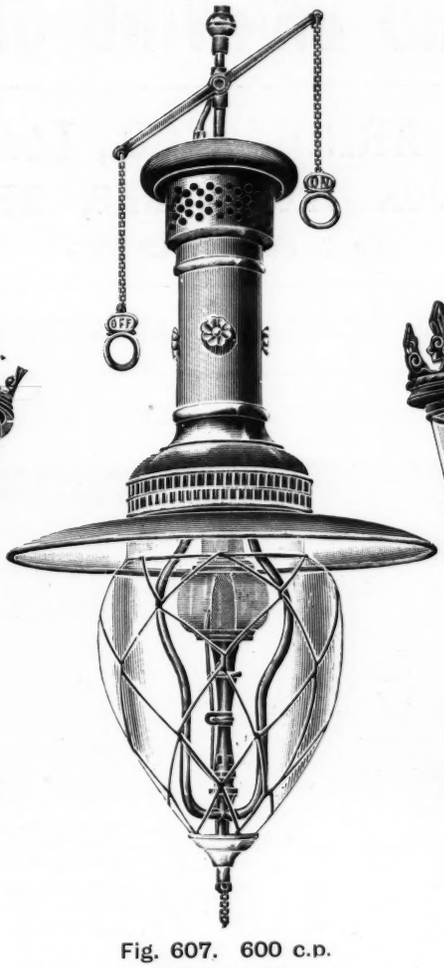

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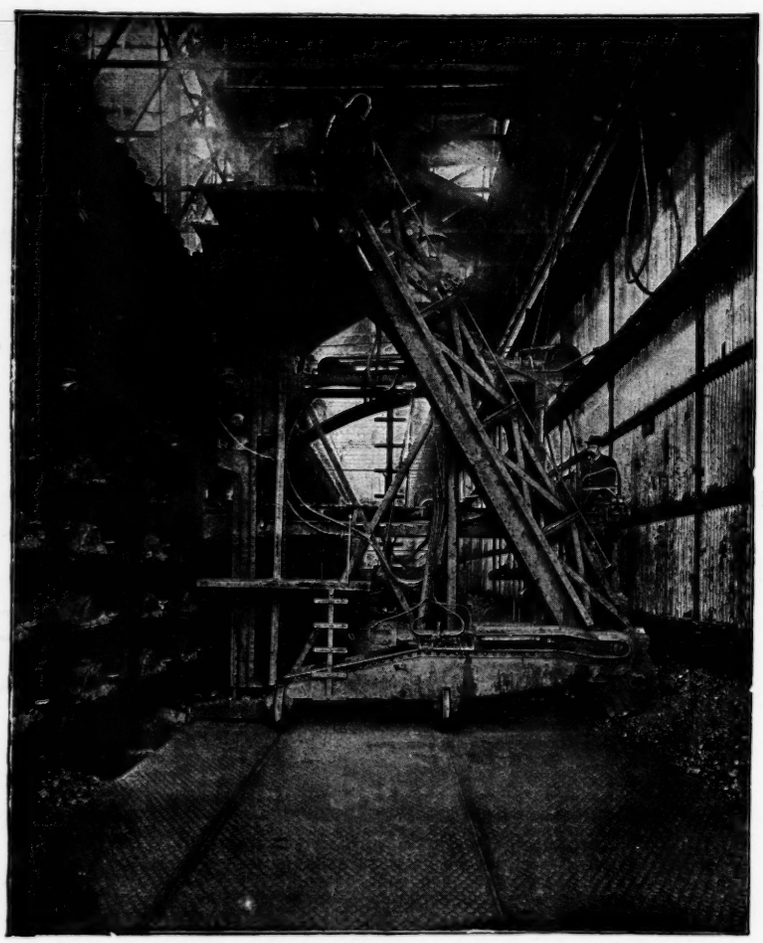

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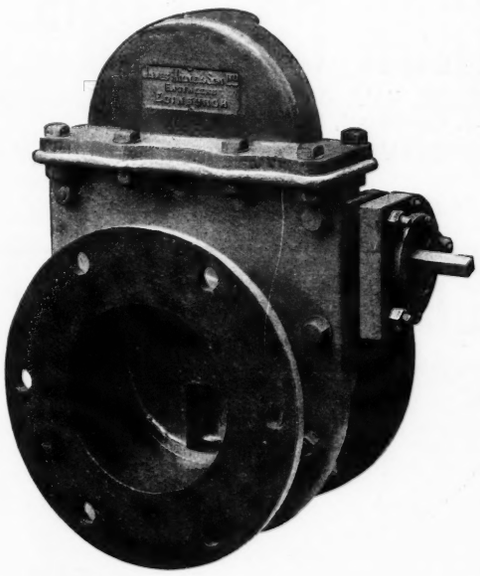

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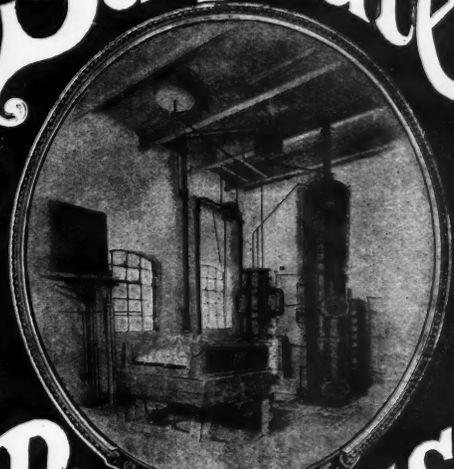

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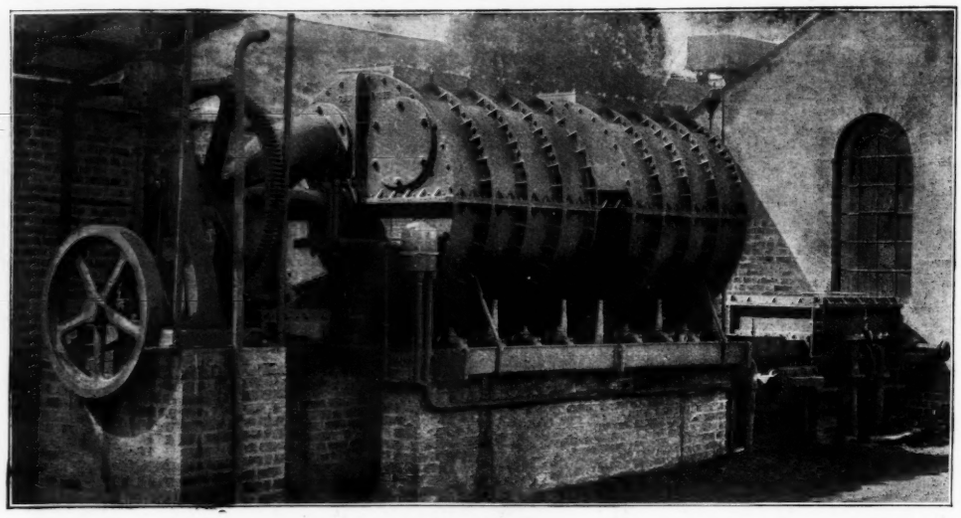

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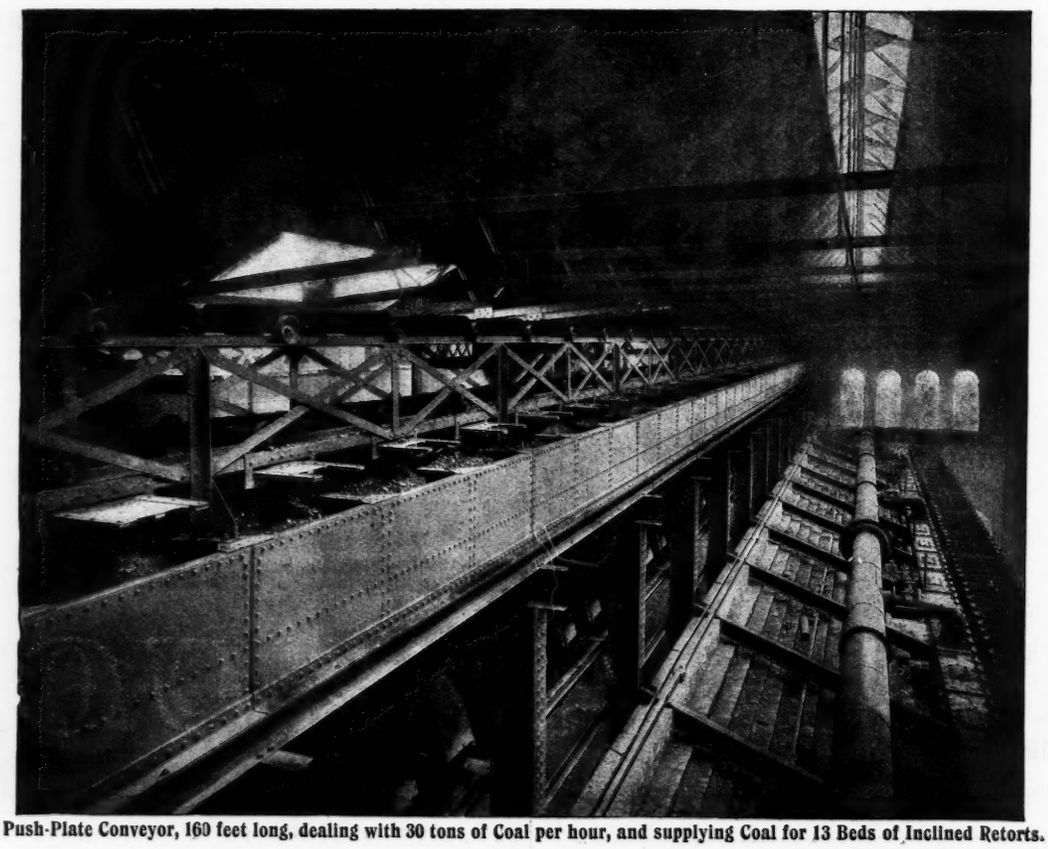

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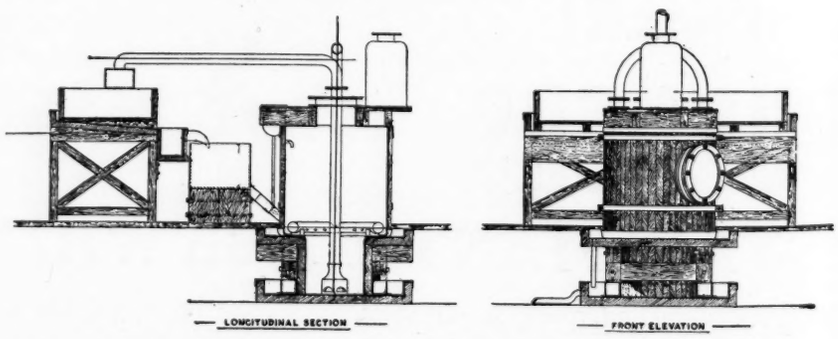

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON.

VOL. XCI., No. 2203.—TUESDAY, AUGUST 1, 1905.

EDITORIAL NOTES—GAS, &c.

An Unsatisfactory Report from the Gaslight and Coke Company.

THERE will without doubt have been considerable disappointment among the proprietors of the Gaslight and Coke Company over the half-yearly report which has been circulated by the Directors—not only on account of the regrettable results of the working, but in respect of the information which is withheld on this occasion. In the report six months since, the Directors referred with gratification to the great International Gas Exhibition which had been held in their district, and which it was anticipated would result in much good to the industry generally, and, people fully expected, to the Gaslight and Coke Company particularly. But there is a strange silence on the part of the Board as to what has been done in obtaining additional consumers—ordinary, slot, and stove—during the half year. Figures on this head were given in the two reports for 1904; and it was hoped, both as the result of the exhibition and of the special efforts that have since been made by the Company, that something of an unusual nature in the matter of additional consumers would have been forthcoming in the present report. Perhaps the Governor is keeping the information back to assist in mollifying the disappointed proprietors at the meeting on Friday. If so, a mistake has been made. But we are inclined to think that, if the Directors had any abnormal figures to present, they would have been published in a report which cannot be regarded, from the proprietors' point of view, as satisfactory.

In the reports for 1904, the Directors were in a position to show that they were retrieving the loss of consumption occasioned by the fierce competition of electricity in their area. In the first half of the year, there was an increase in gas consumption of 3·45 per cent., and in the second half of 2 per cent., as compared with the corresponding periods of 1903. In view of this, it must be with some bitterness that the Directors have to announce a decrease in the sale of gas in the past half year equal to 1·8 per cent.; the total quantity sold being 10,450,895,000 cubic feet, as compared with 10,641,483,000 cubic feet. This again does not inspire any hope that the Directors have anything special to report in regard to the increment of consumers. However, if they have nothing in this way "up their sleeve," they cannot be taken to task for it; for activity in trying to cultivate new business has been one of the features of the management during the half year.

Another source of disappointment will be that, a year having expired since the reduction of a penny in the price of gas was made, the Directors are not in a position to recommend—or rather the half-year's results do not justify the recommendation of—anything higher than the old dividend of £4 8s. per cent. on the ordinary shares; and, to do this, no less a sum than £30,785 will have to be withdrawn from the undivided balance. The profits of the past half year, in fact, show a serious retrogression. Including the £248,192 brought forward, the balance available for distribution is £552,319, as compared with £609,326 for the June half of 1904; and only £217,408 remains to be carried forward, as against £273,975. By reference to the accounts published elsewhere, the causes of the reduction in revenue are not very difficult to trace. There has, in the first place, been a heavy fall in the receipts for residuals; and in this department of the business the Company have apparently not done so well, in proportion, as the South Metropolitan Gas Company. The reduction of a penny in the price of gas and the decrease in the consumption have also together hit the Company rather hard. *Per contra*, there have been several economies effected in expenditure; but, very properly, there has been no lessening of attention to the repair and maintenance of works, meters, and stoves, though a few thousands less were spent on repair and maintenance of mains and service-pipes. Rents, rates, and taxes, in their own inexorable fashion, however, continue to expand. As to the remainder of the report (in which reference is made to the parliamentary work of this session), there is nothing in the nature of intelligence for readers of the "JOURNAL," with the exception of the statement that the Company's annual contracts for coal have been made at prices somewhat below those of last year. Only one allusion to the accounts need be made beyond those inseparable from the report. It is that, although the amount carried forward is still a substantial one, the reserve and insurance funds are small for a Company of such dimensions; and the latter fund was encroached upon to the extent of £8000 during the half year on account of the Southampton Row gas explosion.

Reference has been made to one omission from the report; if rumour is true, there is another. The fact, however, that there is no confirmation of the statement that has gained currency of further pending changes in the Board, will lead to some doubt as to its accuracy. Once before it was pretty freely asserted that Mr. Howard Charles Ward was contemplating retirement. The rumour is again abroad, and, furthermore, the name of Mr. Corbet Woodall has been coupled with the Deputy-Governorship. If this is so, the latter selection will be most popular. However, if the report is not true, the Governor will possibly—knowing from this reference that it has obtained circulation—give denial to it at the earliest opportunity, which will be the meeting next Friday.

Report of the South Metropolitan Company—Purchase of a Monazite Sand Property.

THE criticism that was passed on the report of the Gaslight and Coke in the opening paragraph must be, in order to be consistent and fair, applied to that of the Directors of the South Metropolitan Gas Company. There are points missing from it which we are accustomed to see concerning the new business of the half year, and which attest, in conjunction with the general condition of the accounts, the growth in the stability of the undertaking. There may be, for several reasons, a temporary recession in the volume of business or in the rate of its expansion; but if the proprietors are given the totals or percentage increases in the several classes of gas business, as was done in the last and preceding reports, they have, as a rule, the consolation of learning that the half year has yielded its share of new custom which represents additional strength. For example, in the two previous half years, increases in gas consumption of respectively 4 and 2·93 per cent. were reported. But the new custom was on an altogether higher scale; and the figures were the vouchers of enhanced stability. No doubt the experience of 1904 has been repeated in the first half of this year; but it would have been interesting to have had the verification, more especially as there was only a "small "increase" in consumption in the mild winter months, though a "very good" business later on. Sir George Livesey, we hope, will, at the meeting on the 9th inst., satisfy those who welcome such information as is wanting in the present report.

The influences of the half year have not contributed to superlative results; and we are anticipating that it will be found, as reports and accounts reach us from various parts of the kingdom, that a similar tale will be told all round. Residuals have fallen in value, and the mild winter months were not favourable to big increases in consumption; but in the case of the South Metropolitan Company there has been an increase, though of moderate amount. And remembering in this connection the low price of gas—2s. per 1000 cubic feet—the accounts before us are such that both the Board and the proprietors must be heartily congratulated upon them. Although residuals have been

low in value, more especially coke, a comparison of the figures with those for previous half years admit of the conclusion that the Directors have done remarkably well under the circumstances with which they have had to deal. In the result, the profit of the half year is only short by £7410 of the sum required to meet the dividend at the rate of 5½ per cent. After paying interest on temporary loan, deposits, and debenture stock, there is a balance of £194,174 applicable to ordinary dividends. The payment of the dividend will leave £22,299 to be carried forward. The reserve and insurance funds are in good case; and it is noticed that the former has been augmented by a sum of £7291 on account of the balance of dividend not paid in March last. The only item in the revenue account to which the Directors deem it necessary to direct special attention, is that of £42,092 claimed by the co-partnership. This is the largest sum that has ever been divided in this way; but the Board are convinced that it is earned by "the better and more "intelligent, careful, and interested working of the great "majority of the employees." When such a sum, less £18,000 entered against the accounts of six months ago, is a charge against the revenue of a half year, when gas is sold at 2s. per 1000 cubic feet, when the residuals market is far from its best, and when the weather does not conduce to an exuberant gas consumption, and profits are made sufficient (within £7400) to maintain the Company's dividend of 5½ per cent., who can gainsay the Directors' conviction? We, at all events, are not prepared to do so.

The report bears every indication of having had some of the usual information sacrificed to make place for statements on two other matters of supreme importance; and therefore the Directors may be forgiven their shortcoming in the one particular. We have on several occasions made covert references to the purchase, through British enterprise, of a monazite sand property in North Carolina. The secret is out in this report; the purchasers being no other than the South Metropolitan Company. It is almost superfluous for us to say, from independent knowledge, that to the Chairman's dominant characteristics of initiative and tenacity is due this unique step in defending the Company and their consumers against the monopolies in monazite sand and thorium. We do not desire to make any inflammatory statements concerning the position of the prime constituent of the incandescent mantle; but the fact remains that the visible supplies of the necessity are in the hands of a few, and that is tantamount to a cornering of the supply. Although the price of thorium has risen considerably, no great amount of mischief has so far been wrought; but who can speak with any degree of confidence as to the future? There is this to be said, that even if this independent and remarkable action should not have any immediate or direct benefit for the South Metropolitan Company, there can be no question that the taking of the "bull by the horns" in this manner by Sir George Livesey and his colleagues will make a marked impression just in the very direction where it is most needed. At all events, the Directors of the Company have the satisfaction of stating that, plant being now under erection, a supply of sand from their own property will shortly be on its way to this country, and that their anxiety at any rate as to the future supply of cheap mantles is entirely relieved. The investment therefore bids fair to be a profitable one. We compliment the Directors on their bold step, and on the fact that their deposits of monazite are of a more extensive character than were originally reported as in sight. The development of the Company's experiences in this regard will be watched with much curiosity.

Naturally the recent struggle in Parliament is a subject that is also dealt with at some length in the report; and, with the paragraph referring to the question of monazite sand and thorium, the one alluding to the new gas legislation should, and will, command serious consideration. Comment upon the statements made in the latter regard is unnecessary; but attention may be specially directed to the computation of the terrible waste of money occasioned by the old reckless and senseless attitude of the London County Council and other local authorities towards the Gas Companies, and to the significant remark that "the opportunity of settling once for all the method of testing the "illuminating power of gas for the kingdom, although very "near attainment, has unfortunately been postponed by the "action of the London County Council." There can be no mistaking what these words portend.

Co-operating in Order to Secure Economy in Local Government.

It is of great interest, but of little other value at the present time, to have from the London County Council a report which presents to us some startling contrasts of rating within the, in other respects, incomparable area over which they have general jurisdiction; and equally it is of interest to learn that they propose shortly to submit a scheme by which the equalization of London rates may be carried out. But we have little faith in the repentant mood in which the London County Council are appearing just now before the ratepayers; for if there is one body in the Metropolitan area who have done more than another to countenance municipal extravagance, it has been the London County Council, both by example and by offering facility. It is not so much equalization of rating on the basis of assessable value that is pressingly required (useful though it would be in securing an assurance that one is no worse off than his fellows) as the repression of prodigality; and therefore hearty welcome must be given to all efforts that will conduce to the latter end. The cry of London is that of practically the entire country; and therefore what can be done in London towards correction will exert an active influence throughout the whole country.

The best effort that has yet been made is that which is centralized in the conference on Thursday week, at the Caxton Hall, of some 700 representatives of the commercial and municipal interests of the Metropolis; and we give it that foremost place on account of the men of position, power, and credit who at the meeting came out and identified themselves with the attacking movement on a condition of municipal affairs which will prove the canker to industrial prosperity in many localities if something cannot be done to stay Municipal extravagance and unproductive trading, or trading that is only made productive by augmenting the burden upon the ratepayers. The Duke of Norfolk, Lord Claud Hamilton, a bevy of members of Parliament, Sir Melvill Beachcroft (the Chairman of the Metropolitan Water Board), and numerous gentlemen connected with the industries of London, including delegates from the administrations of practically all the great Railway Companies, were there; and many of them raised their voices against the monstrous danger and evil with which we are being faced. The Government have not moved in this matter of the rates, though long since urged to do so; suggestions for legislation which will impose additional burdens having of late years been more to their liking. The men, however, who have now taken up the cudgels (since the meeting was held the Lord Chancellor has placed himself in their ranks) are exactly those who can do something towards inducing the Government to seriously note the gravity of the position, and render assistance in formulating a scheme which shall effect the purpose that all who wish well to the country must desire. The enormous cost of London Government (as the Gas Companies among other industrial concerns are only too well aware) does not promote the really progressive interests of the Metropolis; but it does, as the Duke of Norfolk so forcibly put it, clog the footsteps of that progress, and threaten at no distant date to undermine it, and bring it down with a crash. What applies to London applies elsewhere. The tale of increased expenditure on local government in the Metropolis without commensurate gain or privileges is that of most cities and towns in the country; and there is urgent need for inquiry to ascertain the causes of this. As his Grace pointed out, in the year ending March, 1892, the amount spent on the local government of London was close upon 12 millions; in a single decade, it rose to 24 millions; and during the past six years it has been rising at the average rate of a million a year. But if we look at the report of the Traffic Commission, it is found that the population in 1891 was 5,633,809; while in 1901 it had only increased to 6,581,402. There is no relation whatever between the figures.

But the greatest harm occasioned by the excesses of local government is in the direction of industry. While the Municipalities simulate an almost passionate regard for the prosperity of local industry, they are, by their increased wants, doing their utmost to kill it. The injury to local industry is having a widespread effect; and it is leaving its trail of misery in the homes of the working class and of depression in the business establishments of the local—more especially the smaller—tradespeople. This is no phantasm, as is proved

by the recent statement of a gentleman in high position in connection with the Surrey Commercial Docks, that they are contemplating the removal of the docks to a cheaper-governed district, solely on account of the heavy tribute they are called upon to make to the local funds. How can there be any prosperity of continuously robust growth in a locality while industry is held in subjection by local needs in this way, and while it has denied to it the requisite freedom for expansion? No one can speak more strongly on this matter than Lord Claud Hamilton, the Chairman of the Great Eastern Railway. At a meeting of the Company a few months ago, he lamented the very serious injury that was being done to their property by the rate-aided competition of the tramways in London and the suburbs, notwithstanding that the Railway Company have to bear such a heavy load of the rate-burden. There would be competition beneficial to the locality if the tramways were conducted by private enterprise, and so on equal grounds. But this is not the case now; nor is it the case in the competition between gas and municipal electricity supply.

Lord Claud Hamilton at the Caxton Hall meeting touched the right spot when he said there were two agreed main propositions—that no municipality should pay a fancy rate of wage, and that it should not undertake any project with the ratepayers' money which could be done as well, if not better, by private enterprise. But we would reverse these propositions, to put them in their proper order of importance. It has been proved over and over again that many of the enterprises into which municipalities enter cannot be defended on the ground that they contribute to local economy; and even where they are successful, they must divert capital from the district, and restrict the opportunities for the employment of the private capital of the ratepayers, which is not to the benefit of the district. The municipal supply of electricity for ordinary purposes, save in exceptional cases, is an example of this, and is an undoubted financial blunder, as many, to their cost, have been compelled to recognize, though they will not always acknowledge it.

As the outcome of the conference, we have the 700 representatives declaring that the abnormal growth of London municipal expenditure, imposing as it does an excessive burden upon the commercial and working classes, is detrimental to the industrial prosperity of London. It has also been decided to form in each of the Metropolitan Boroughs a representative Municipal Committee, for the purpose of securing co-operation among the various existing organizations that are interested in the reform, on economical lines, of the present municipal system. There have been too many separate institutions and interests flogging away at this subject in their own particular way; and their binding together by such men as those who spoke at the Caxton Hall meeting will supply a stronger and more effective coalition for both offensive and defensive purposes.

A Prospectus and a Protest.

THE prospectus that was issued to the public last week by the promoters of the "West Suburban" Gaslight and Coke Company, Limited, is one against which we feel obliged to enter a protest. It is a seductive document for the public; and an amusing one for anybody who is not an ignoramus in regard to gas matters. Let us first put ourselves straight with the promoters by saying that we do not allege there are any untruths in the prospectus; but it is asserted that there are some statements in it which cannot attain corresponding actuality for many long years (if ever) in connection with the West Suburban Gas Company. In the first place, the use of the word "Suburban" imparts to the title a likeness to that of a Company of high condition in the suburbs of London, with Sir George Livesey as the Chairman. Imitation may be the sincerest form of flattery; but it is to be hoped that no future investor, through such imitation and flattery, will, in ignorance, confuse one Company with the other. Whoever conceived the idea of adopting the words "West Suburban" no doubt at the same time imagined he had made a splendid hit.

We are sorry the promoters have not shown a little more consideration for those whom they have invited to put their trust in them, by giving information as to the actual financial and structural condition of the Colnbrook Gas-Works, and their ability in respect of production and storage. But as gas has been sold at 6s. 10d. per 1000 cubic feet, and is going to be sold at 5s. 10d. in the future, we cannot bring ourselves to believe that the business has been a gold mine in the past, is so at the present time, or is going to be one for many long years to come. The Company is being issued with a capital of £30,000, of which £11,750 is to be paid for the Colnbrook Gas-Works and all their non-statutory rights and privileges; and the balance between that sum and the £30,000 (if obtained) is to be utilized for the development of the works and business. As a sop to the public, the vendors are guaranteeing 6 per cent. on the preference shares and 6 per cent. on the ordinary shares, for how long?—one whole year! after which, if the promoters succeed in getting the £30,000, a dividend of 6 per cent., anyway on the ordinary shares, will, one is strongly inclined to think, be for many a day something only of happy memory rather than of realization year by year. This piece of magnanimity on the part of the vendors is succeeded by another. They are going to pay the entire costs of incorporating the Company and all the expenses up to the date of allotment, which are estimated at £1850. Well, now, if we deduct this sum and make a fairly liberal allowance for what will be required of the dividend guarantee if the capital of £30,000 is obtained, and then, just for the sake of argument, incline ourselves to believe the vendors are making a little profit on the transfer of their property to the "West Suburban Company," most gas men will concur that the promoters have taken a decent long-bow shot from the actual value of the Colnbrook Gas-Works to the £30,000 which they are asking the public to subscribe—of course, largely for exploiting a rather barren-looking district. The promoters might at any rate have told the public what profits are at present being made at Colnbrook, so that they would have had something more than a mere supposititious basis upon which to plant their hope.

What of the future? The promoters have made overmuch of the supply of a number of districts surrounding Colnbrook, of the existence of which few people not residing in them will have the slightest knowledge. The promoters speak of certain "requisitions" from the inhabitants of these districts, and of a "large number" of inhabitants having requested the Directors to give them greater facilities by the introduction of penny-in-the-slot gas-meters. But we do not find in the prospectus any figures indicating what is meant by "large number;" and we question the continuance of this poor-class custom, if (see the Engineers' report) anything like 25 per cent. above the 5s. 10d. is going to be charged. Neither does the prospectus, as already intimated, afford any idea of what is being done by the Colnbrook Gas-Works in the way of business in the present. But it does give a hypothetical calculation, which promises remarkable success "when the developments have been carried out." The sale of gas should, the promoters say, exceed 30 million cubic feet at 5s. 10d. per 1000 cubic feet; and this will give a profit of 6 per cent. on the preference shares, and 12 per cent. on the ordinary shares, and leave £2860 to be carried forward for further dividends on the ordinary shares and for reserve purposes. Who says the gas industry is in a decaying stage, when 12 per cent. dividends are prophesied from Colnbrook and the surrounding districts with gas at 5s. 10d. per 1000 cubic feet? But if these generous promoters had only the "courage of their convictions," and if they really believed in that 12 per cent. dividend, then—well, what a valuable income could have been made by them simply by procuring capital in another way than by issuing it at par to the confiding public. The prospectus we denounce as misleading in this—that the promoters have taken, for examples of prosperity in the gas industry, old-established statutory Companies carrying on their operations in towns of considerable importance, and have shown the dividends on, and the market quotations of, the unconverted capital of those concerns—dividends ranging from 10 up to 17 per cent.; and with market prices for shares and stock two to three and more times their nominal value. Fairer would it have been to have quoted the dividends of companies whose market prices are nearer par value, and whose dividends are nearer the actual return to present-day investors. Against such unfair practices of promoters we do strongly protest, and shall continue to do so. Our earnest hope is that on this prospectus, with its several deficiencies, the public have not subscribed even 1 per cent. of the money asked for.

[Since the above was in type, a correspondent—sending a copy of the prospectus—writes: "What do you think of the "enclosed? The Colnbrook works were offered a short "time back for £1200. The make is just over a million!!"]

Exposing an Electrician's Report on Public Lighting.

It is somewhat strange that, until a few days ago, we had not heard anything further of the report that Mr. Fedden, the Electrical Engineer to the Sheffield Corporation, made some weeks since to the members of his Committee on the subject of substituting electric arc lamps for incandescent gas-lamps for public lighting. It was Mr. Hanbury Thomas, the General Manager and Secretary of the Sheffield Gas Company, who again brought Mr. Fedden's report to mind by paying us the compliment of saying that, until he saw the comments on the report in our "Electric Lighting Memoranda," he was not aware of its existence. One good turn deserves another; and so Mr. Hanbury Thomas sent us a copy of the letter, criticizing the report, that he addressed to the Chairman and Members of the Corporation Watch Committee. This was reproduced in the "JOURNAL" last week, in view of its interest as bearing both upon an exceptional condition of things in Sheffield and upon the subject of public lighting generally. When animadverting on Mr. Fedden's report, we dealt with some of his misstatements concerning incandescent gas lighting; and Mr. Hanbury Thomas also calls attention to them in his letter. We also referred to the mass of figures with which Mr. Fedden sought, it seemed to us, to perplex rather than to enlighten his Committee. We further showed that gentleman that, if he wished to be honest and loyal to the ratepayers, whose interests he is supposed to serve, he would not be doing so if he succeeded, by employing unjust methods either ignorantly or knowingly, in displacing an economical by an uneconomical system of lighting. Of course, we could then only comment on the position of affairs as presented to us by the report, which, in respect of the obfuscation of its subject was (again, we say, either by intention or ignorance) skilfully drawn up in a manner to confuse. Mr. Hanbury Thomas throws further light into its darkened corners from his intimate knowledge of the real position of matters at Sheffield. Mr. Fedden's suggestion is to displace, at a cost of £2700 to £3600 (a nice margin on such a sum), by 89 arc lamps at £14 per lamp per annum (which is cutting things very fine), or a total of £1246 per annum, 260 four-light incandescent gas-lamps at £3 14s. 3d., or a total of £965. Curious to relate, Mr. Hanbury Thomas can only find 224 gas-lamps and not 260, in the thoroughfares proposed by Mr. Fedden as suitable for his non-economizing attentions. But Mr. Fedden, it seems, has also been drafting his report on the lines of the modern method of the electrician to realize economy, which has not needed any great exercise of mental power to devise, by spacing out the lamps to a greater extent than electricians originally considered to be the proper thing. Sheffield has had a taste of this system of economy before in the Market Hall; and councillors will not be prudent if they are caught napping in the same way again. The letter by Mr. Hanbury Thomas is worth reading, as it shows what an immense advantage the ratepayers and gas consumers, including the Corporation, have gained by supporting the Gas Company in the past; and it also gives them an indication of what they would lose by turning their backs on the Gas Company now in the matter of public lighting. Unfortunately for Mr. Fedden, he has to compete with gas at 1s. 2d. per 1000 cubic feet, of which price the Sheffield Company have good reason to be particularly proud.

A Councillor's Courtesy.

Electricity has come in like a lion at Malton—that is to say that, on the part of certain members of the Urban District Council, there has been a great deal of noise over the matter. The Northern Counties Electricity Supply Company have secured the lighting of the town for the next three years, at a price which does not seem to hold out any great hope of being excessively remunerative—they having to find all the lampposts, lanterns, and fittings, and to perform all the services required in lighting, extinguishing, and maintaining, and to give a 70-candle power light in each lamp for 1700 hours for the sum of 35s. This, however, is their own affair; and we have merely to wish them joy of their contract. What we feel it is our duty to do in the matter is to protest against the tone adopted by the member of the Council who moved the adoption of the Lighting Committee's recommendation that the Electricity Company's tender should be accepted. There will be found reported on another page as many of this gentleman's remarks as we are able to find space for; and it will certainly be generally agreed that they form a very fair example indeed of "how not to do it." While asserting in one sentence that there was no wish whatever to be discourteous to the Gas Company, in the very next they were likened to a "whipped spaniel," and a little later on the "sneaking way" in which their revised tender came in was referred to. Of course, there were also the inevitable allusions to the advisability of breaking down the Gas Company's monopoly, and to the large sum of money the town would have saved if the electric light had made its appearance years ago. No doubt the gentleman in question was actuated by the best of motives as a representative of the ratepayers; but his arguments would not have lost weight, while his speech would certainly have gained in dignity, had some of his statements been marked by greater moderation. More especially will this be admitted to be the case when it is remembered that the Engineer of the Gas Company (Mr. Henry Tobey) was presiding over the meeting, in his capacity as Chairman of the Council—with his tongue tied, as he was an interested party in the subject under discussion. We are, of course, not denying the right of the Council (so long as the ratepayers' interests are duly considered) to light the streets in such manner as they may think fit; and, as a matter of fact, in the present instance the Gas Company are in no particular need of sympathy. Indirectly, the Malton Gas Company will still continue to provide the light for the public lamps, as the current will be produced by engines using their gas. This, however, does not in any way affect our contention—which is that, after their many years' service to the town, the Company were deserving of a more kindly and considerate attitude than has been adopted towards them by a section of the Council.

The Fog and Smoke Problem.

The two papers dealing with the subject of smoke and fog which were read in the Engineering Section at the annual congress of the Royal Institute of Public Health last Tuesday, and which are given in abstract in another column, did not add very much to the stock of knowledge upon it, or result in anything more than the passing of a resolution urging upon the Government and local authorities the advisability of further efforts being made in the direction of clearing the atmosphere of towns from smoke. Everybody is painfully conscious that smoke is disagreeable, and that fog is harmful; while the two combined in what has up to now been known as the "London particular," but which will in future be alluded to under the newly-coined word "smog," is simply detestable. As, however, we cannot all run away from it into the country, as suggested by the Hon. Rollo Russell, how are we going to get rid of it? Obviously—at least so far as one of its constituents is concerned—by not creating it. Factory chimneys have hitherto been blamed for much; but it is the coal in the kitchen fire that is one of the most active contributors to the production of the dark pall which sometimes covers London. This is evidenced by the fact that on Sundays, when fires are not started till rather later than usual, the early morning fog is commensurately tardy in making its appearance. In fact, a keen student of fogs professes to have detected three distinct kinds—the breakfast, the luncheon, and the dinner fog. Efforts should therefore be directed to the banishment of the coal fire, and the substitution of smokeless cooking, which we are told would relieve us of no fewer than 600,000 smoking chimneys. This is what the gas companies have been urging for years, more particularly during the last quarter of a century. But to go back no farther than a decade, the result of their labours in the Metropolis alone is shown by the increase of 470,000 in the number of cooking-stoves used by the consumers; no less than 350,000 of them being on the prepayment system. Surely these must be credited with having done something towards reducing the bulk of London smoke; and it is to their still more extended use that the inhabitants must look for further abatement. As to how far the diminution in the volume of smoke emitted from household chimneys will relieve us of fog, we will not offer any opinion; but it cannot fail to do so to an extent which is worth striving for. This is precisely the direction in which the suppliers of gas are moving. By the production of a gas suitable alike for lighting and cooking purposes, and the introduction of penny-in-the-slot installations, smokeless fuel and the means of utilizing it have been brought within the reach of the artisan; and one phase of the fog and smoke problem has been successfully attacked. It will be for the Government and the local authorities to turn their attention to the others, as requested by the resolution. But whether they do

so or not, they can at all events refrain from putting obstacles in the way of the manufacture of gaseous fuel at the cheapest possible rate; for this will undoubtedly be the fuel of the future.

A Question of Duty.

A very substantial part of last week's meeting of the Lancaster Town Council was taken up by the consideration of the Gas Committee's minutes. These minutes touched upon one particular matter which was of great importance to the Gas Department and the town generally; but, singularly enough, this was not the subject out of which the discussion grew. The report of a Sub-Committee appointed to consider the advisability of reducing the price of gas for power purposes, their recommendation to the Gas Committee that some concession should be made, and correspondence showing that unless a further inducement than the reduction offered is held out, the Corporation will lose a very large consumer, were passed over with just one expression of regret. But quite a different condition of affairs arose with regard to a dispute between the Gas Committee and the Lighting Committee as to who should incur the cost of laying a main to a lamp which is said to be required in an outlying road. As to the price of gas for power, it was stated that the Gas Committee were "waiting for something to turn up." No hint was given as to what this "something" might be; and no one was curious enough to inquire. Perhaps the very mysteriousness of the observation afforded the Council satisfaction; or perhaps all minds were so firmly fixed upon the tussle between the Committees on the question of mainlaying as to exclude everything else. The probabilities are greatly in favour of the latter explanation being the correct one, having regard to the amount of discussion that took place as to the dispute. The point at issue was one of duty—Whose duty was it to lay the necessary main (at a cost of some £20) to supply a gas-lamp in a road containing one house, and therefore not offering an adequate return on the outlay? The Gas Committee contended that it was the Lighting Committee's; while the Lighting Committee asserted that the Gas Committee should carry out the work, as they had done before. This seems to be a small matter for the Gas Committee to "kick" at, while they are willing to supply free gas for lighting the town, which represents about £1500 a year. But, on the other hand, the Lighting Committee, who have so much given to them, should have no need to be particular over an occasional few pounds expenditure. We agree with the Mayor that it is the duty of the Lighting Committee to light the town; but this they cannot be said to be doing so long as the gas consumers alone pay for the gas that is supplied (for the benefit of the citizens generally) to the public lamps. The gas undertaking at Lancaster proves no exception to the rule in the benefits which it confers upon the ratepayers; and it is pleasing to note that the efforts of the Gas Committee and of the Engineer (Mr. C. Armitage) are so well appreciated.

Incandescent Burners and Gas Consumption.

Remarks of Gas Engineers and Chairmen of Gas Companies and Corporation Gas Committees that have appeared in the last few volumes of the "JOURNAL" show the universal experience to have been that the extended use of incandescent burners has very sensibly affected gas consumption. Consolation has, however, very generally been derived from the reflection that the economy and the superior light-giving qualities of this modern system of illumination must in time benefit gas undertakings by securing new consumers as well as by retaining the custom of some existing ones who possibly would otherwise have been attracted by the glamour of electricity. If this view of the matter is a sound one—as we believe to be the case—it is decidedly good policy to encourage to the utmost the use of incandescent burners by pointing out the pecuniary and other advantages to be derived from them. It seems, however, that it is not always possible to allow the consumers to enjoy the full benefits of the economy secured by the incandescent system—at least judging by a circular that has been sent to the consumers by a Cornish Gas Company. This circular is an intimation by the Directors that "in consequence of the greatly reduced consumption of gas, owing to the general use of incandescent burners, they have reluctantly been compelled to advance the price of gas 6d. per 1000 cubic feet—viz., from 6s. to 6s. 6d." By way of reconciling the consumers to this considerably higher charge, it is pointed out that "the incandescent burners have effected a reduction of 10 per cent. in the consumers' gas bills; and the small increase in the price of gas will not, consequently, be felt to any appreciable extent." According to this statement, consumers, because they burn 10 per cent. less gas, are to be charged about 8½ per cent. more for what they do take; in other words, a little more than four-fifths of the money saving which the Company say has been effected by the adoption of the incandescent system is to go to them, while something under one-fifth is to be retained by the consumer. The increase in price is, it is to be presumed, quite necessary, or (in view of the already substantial charge) it would not have been made; but we are doubtful whether the consumers will be altogether satisfied with the explanation offered. At any rate, one may hazard the opinion that the people living in this particular part of the country will not, after their present experience, display the same alacrity in adopting other money-saving gas appliances that may be introduced as they seemingly have done in fitting their houses with incandescent burners.

Private Enterprise v. Municipal Trading in America.

According to a correspondent of the "Financial News," municipal trading in the United States has just received a serious set-back at Chicago. When the present Mayor—Judge Dunne—was elected, he assured the residents that the city would take the lead in America in municipalizing public utilities; and the street railroads were to be the first objects of attack. The project was hailed with approval by municipalizers; and Mr. J. Dalrymple, the General Manager of the Glasgow tramways, was invited to Chicago to bless the new campaign. Before he returned home, however, he let fall at Philadelphia a few observations which showed that his visit to the States had had the effect of altering his views on the subject of municipal ownership, in which he had been a firm believer. He confessed that what he had seen in America had made him realize that private ownership, under proper conditions, was far better for the citizens. He said that "to put street railroads, gas-works, telephone companies, &c., under municipal ownership, would create a political machine in every large city that would be simply impregnable." He added that "these political machines are already strong enough, with their control of policemen, firemen, and other office-holders; and if, in addition to this, they could control the thousands of men employed in the great public utility corporations, the political machines would have a power that could not be overthrown." It is not the first time that this opinion has been expressed; and we can lay claim to an enunciation of it in these columns. In order to get out of his difficulty, the Mayor has put forward a scheme which has provoked a certain amount of ridicule. He proposes to create a new body which is to take over the existing lines, the franchises of which have expired, to build new lines, and to acquire other lines as the leases fall in. It is to have a life of twenty years, and to be managed by five Trustees (to be appointed by the City Corporation), who are to be responsible men of business, are to have the powers of a board of directors, and are to choose their successors. Our financial contemporary's correspondent suggests that when the Trustees have commenced operations there will be every opportunity for them to appoint their own and the Mayor's partisans, and "dip their hands into the contracts for building and equipping the lines." Moreover, the temptation to create a political machine that would be "simply impregnable" (to use Mr. Dalrymple's significant words) would be scarcely likely to be resisted.

More Advice on the Making of an Engineer.

If the engineer of the future is not a much more capable man than his predecessor of the present day, it will not be from lack of facilities for obtaining instruction in his profession, or of advice as to the best way of turning it to account when it has been received. The latest "guide, philosopher, and friend" of the young engineer is Mr. B. E. Chollar, of Kansas City (Mo.), who prepared for the annual meeting of the Western Gas Association a paper on what he rather facetiously described as the "whence, why, how, now, and hence" of the engineer. The greater portion of the paper was historical and philological; but it concluded with some pertinent remarks which should be taken to heart by all who are passing through the preparatory stages of their professional life. Mr. Chollar emphasizes the point that

"the young engineer must know how to do things, and to do them well." His education—his "leading out" from the ranks of his fellows—must have been directed to this end; otherwise he will not be able to give the right orders at the right time, and see that they are properly executed. He may "know," as the result of his scholastic training and subsequent study; but it does not follow that he will be able to "do." The judicious combination of the theoretical and the practical will go a long way towards ensuring success. This is an age of examinations; and there is no doubt they show the extent of the candidate's knowledge. But the student must not think he is educated the moment that he gets his diploma; for, as Mr. Chollar reminds him, he will then only have found out how little he knows. The diploma is a letter of recommendation to be used only once; the next will come from the "boss." Both must be used so as not to throw discredit upon the givers. "It is not difficult to attain a reputation," a distinguished musician, now gone to his rest, was in the habit of telling his pupils; "the difficulty is to keep it." The winning of a medal or a prize marks a young man as someone from whom good work should be expected as the years go on. "*Nulla dies sine linea*" must be his motto; and we question whether the increased wisdom that is thus acquired will bring the sorrow which the Preacher declared would follow its acquisition. To one other point Mr. Chollar ventures to direct the young engineer's attention, and it is not a mechanical but a literary one. He shall speak for himself on this matter. "The colleges complain of the bad spelling of their students; and the technical schools complain that many of their graduates are unable to write a report in decent English." This fault is not confined to the other side of the Atlantic. A Cambridge professor declared not long ago that the composition of the technical papers he had to examine was so bad as "to hide or to travesty the sense itself." Clearness of diction should not be unworthy the attention of the young engineer who wishes to be a good all-round practitioner. It will save him and others, as has so often been pointed out, much unnecessary trouble.

Prize Competitions of the Société Technique.

Promptness of announcement is certainly one of the strong features of the French gas organization, for we have just received the list of prizes that are open to competition between now and the next annual meeting in Paris of the Société Technique du Gaz. The notice also intimates that a new list of competitions is being arranged for the following year; but for next year the prizes remain as they were before. We may just call them to mind in summarized form. First, there is the general prize of 10,000 frs. (£400) to be awarded, in whole or in part, for any notable progress in apparatus for the manufacture or utilization of gas. The same amount is also offered for any new incandescent burner showing marked superiority over those existing at present. Then the sum of 5000 frs. (£200) is open to be given as an encouragement to inventors in their endeavours to make improvements in systems of automatic lighting. Competitors should communicate with the Société Technique (at No. 105, Rue Saint-Lazare, Paris), and send drawings and description of their apparatus before Feb. 1, 1906, stating also in what towns, and for what length of time, their arrangements are and have been at work. These requirements had not been complied with by some of the competitors last year, and should be noted by any person intending to compete. A sum of £200 is also offered for progress in gas heating and cooking stoves, and a like amount for improvements in apparatus for utilizing coke, including also in this category producers for poor gas. Tests on the latter will have to be made for at least fifteen days, and the date and other conditions are the same as given above. For artistic gas brackets and fittings there is a prize of 5000 frs., to be awarded in whole or in part. Last year, it may be remembered, as the President mentioned in his address, no one sent in any prize essay for the regular competition of 8000 frs. (£320). This sum is again offered for the best thesis on any subject whatever of interest to the gas industry. Such essays must be in French and unpublished, and should not bear the name of the author, but only a distinguishing mark or motto—the writer's name being sent apart. The latest date fixed for sending in is March 1, 1906. All the foregoing prizes and competitions are open to any person, whether French or not, and whether a member of the Société Technique or not. It may be hoped that English competitors will not be absent from some of these competitions, and may prove successful in obtaining distinguished place and recompense in the different classes. There are also the usual prizes for members of the Society for the best papers contributed to the annual proceedings, and also the customary medals and awards for clerks and workmen having the best and longest records of service.

NOTES FROM WESTMINSTER.

Affairs at Westminster have during the week maintained the animated condition which they assumed the previous week. The present intention of the Government seems to be to hang on, however bitter the obstruction, to the end; and the Opposition have accordingly set themselves to make things as lively and as troublesome as possible for the dominant party. The divisions of the week have given respectable majorities to the Government; and they now look upon their defeat of the previous week with much more equanimity than they did. The tactics of the Opposition have included the "holding up," by the Irish Nationalists, of some thirty to forty Private Bills, including the London Gas Bill, several railway measures, and Bills promoted by Corporation and other authorities. There is no sense or reason making private measures, innocent of all political character, suffer through disagreement over Imperial matters. This is not the first time this session that the Irish Nationalists have by the manœuvre practised on two or three days last week jeopardized the progress of Private Bills; and it is a pity that it should be within the power of any individuals in the House to vent their spleen in this manner upon inoffensive Bills. Thousands of pounds are spent upon the promotion of some of these measures, upon many of them communities and companies are anxiously depending, and their passing in most cases means the provision of work for large sections of labour. There ought to be means of exempting such Bills from tactics such as these. It was only on Thursday night, after blocking the Bills the whole week, that the Irish Nationalists gave way, and then it was upon an appeal by Mr. Crooks in the name of labour. One other special event of the week was the attempt of Mr. Churchill to get a vote favourable to quinquennial instead of septennial Parliaments; but the House were strongly opposed to it.

Electricity Power for London.

The proceedings on the Administrative County of London and District Electricity Power Bill have been ponderously rolling along during the week. After nine-and-a-half days, the case for the promoters was concluded on Wednesday; and even then there was a wiping out by Counsel of a large amount of evidence which had been prepared. The case for the opposition was then opened; and the Committee ended their work for the week on Thursday, to resume again yesterday. The manufacturers who have been won over by the promises and assumptions of the promoters gave a large part of the evidence submitted during the week; and they seem to be absolutely revelling in the anticipation of obtaining motive power (when the Company get to work, which is not likely to be an accomplished fact for two years at the very earliest) at the ghost of the price they have to pay now. Among the manufacturers, was a Mr. F. Dyer, a cabinet maker. The cost of electrical power in Shoreditch some time ago led him to adopt a gas-engine, with the result that he got all the power he wanted for £90, as compared with £200 when electricity was the favoured method. If he can get electricity for ¾d. a unit, he expects to save another £30. If there is any ground for his expectation, this ought to show the Gas Company how far they must go if they wish to retain his custom. Regarding finances, a banking authority does not think there will be any difficulty in raising the necessary capital; but it is seen that for four years the promoters desire to pay dividend out of capital. The opposition have made a critical attack on Mr. Merz's estimates and assumptions. Colonel Crompton avers that the Engineer has made them on Tyne prices, and not on London conditions; and the "deception" that he thinks Mr. Merz has practised upon himself is represented by about a couple of millions sterling. The evidence given by the Borough Councils and the Electricity Supply Companies as to what they are able to do now, and will do in the future if left alone, is following the track made in the Lords. The Poplar Council, as a matter of fact, have been offering the price to consumers of current for power supply that appears in the Bill. A great deal of importance, it was noticed, was attached by the Committee to having the opinion of the Board of Trade on the purchase clause put in by the promoters; but the Board do not appear to possess an opinion. Mr. T. H. Pelham, the Assistant Secretary to the Board, was called, and stated that they did not express any opinion as to the reasonableness of 50 years as compared with the usual 42 years. He did, however, assert that in the matter of the price the terms proposed by the promoters are far more favourable to the sellers than are given in the Act of 1888. He, however, was not aware that there was any precedent—either electrical, gas, or water—for the purchase price being fixed by capital expenditure; and again he said the Board were not prepared to express an opinion as to whether this was the right method of fixing the price. Most people will see very good reason why capital expenditure should not be the basis of purchase. Another point made by Mr. Pelham was that it ought to be quite clear that the depreciation fund at the time of the purchase should go over to the purchasing authority. That, however, will not avail the purchasers much if some provision is not made to see that there is no failure on the part of the Company to keep the depreciation fund at an adequate amount. There were certain amendments suggested by the Board, which were adopted by the promoters. One other point, which bears upon the Traffic Commission's report and the question of the use of the subsoil. It has been stated during the week that the

scheme contemplates the provision of 570 miles of mains. This being so, there is something before the people of London, should the Bill go through, which will raise the traffic problem anew.

The Gas Companies and the Bill. The Gaslight and Coke and South Metropolitan Gas Companies have had quite a casual kind of innings before this Committee on the points upon which they are opposing. They seem to merely drop in where they most conveniently can. In no way, however, have they shifted from the ground occupied when the Bill was in the Lords. Competition is objected to by the Gaslight and Coke Company, and they are not favourably inclined to having this Electricity Power Company purchasing their land at Fulham, though the land has been previously in the market. This fact somewhat weakens their case. But the position has been altered since the Bill was in the Lords. The restriction of the area of the Administrative Company has been the means of excluding Fulham; and therefore the Gas Company contend that there is now even less reason than before why the promoters should want this particular bit of land. In the case of the South Metropolitan Company, their position is decidedly stronger than that of the Gaslight Company. Certain of the principal promoters of this Bill are of those who fought the South Metropolitan Company in Parliament when they got parliamentary powers for their new land at East Greenwich, and who then resisted the desire of the Company to get an additional piece of foreshore for a jetty for facilitating operations on the new land. The fuss that was then made about the injury the Gas Company were proposing to do other people is reduced to utter absurdity by the fact that the Electricity Company are taking exactly what they want of the land the Gas Company formerly asked for; and, in addition, they are seeking running powers over the Gas Company's yet unconstructed siding or for part of their land for accommodating a siding of their own. Personal interest has a great effect in changing the condition and aspect of things. However, the South Metropolitan Gas Company do not object so much to having the Electricity Company as a neighbour as to having them bisecting their land or, as an alternative, interfering with their operations on their own railway siding. Beyond this the opposition of the Gas Companies does not go. We have mentioned Mr. Dyer's evidence in the preceding paragraph on the subject of gas-engines and electricity; and no less an authority than Mr. Merz, on the question of competition, urges that the promoters most serious competitor will be the small gas-engine, which is being improved daily. We suppose we ought to be very grateful to Mr. Merz for this recognition; but we are not. What he said was quite true; but, of course, his object in saying it was to blunt the edge of the Gas Companies' hostility.

ELECTRIC LIGHTING MEMORANDA.

Generating Electricity (for Lighting) by Means of Town Gas—A Wise Electricity Committee at Norwich—Bristol's Profits and Accountancy Methods—Blighted Nernst Hopes—Electricity Power in Gas-Works.

"THE cheapest electric light" is a phrase with which we have become accustomed by the advertisements of gas companies who advocate the employment of gas-engines with town gas for privately generating electricity for lighting purposes; and the testimony of Mr. Andrew Watson of the Coliseum, Stockton-on-Tees, communicated to the "Electrical Review" corroborates the genuineness of the advocacy. In this case, the plant is situated in the basement of the establishment, and consists of three 50 brake horse power "National" gas-engines, running at 220 revolutions per minute. The electrical plant has a capacity of 150 amperes at 230 volts. The installation (the capital outlay for which was £1600) dates back to May, 1901; so that there has been a fair amount of experience with it. In the seven months ending Dec. 31, 1901, the total cost of generating 36,170 units, including interest and depreciation at 10 per cent., was 2·06d. per unit, which effected a net saving of £354 2s. 11d. For the twelve months ending Dec. 31, 1902, 67,077 units were generated; the total cost being 1·96d. per unit, and saving £729 8s. 11d. For the twelve months ending Dec. 31, 1903, 64,504 units were generated; the total cost per unit being 1·43d., and the net saving £677 9s. 5d. The figures for the year ending Dec. 31 last (the total units generated being 65,288) are set out as follows, and are worth reproducing:—

	Gross.	Per Unit.
Gas consumed, 2,061,000 cubic feet	£231 17 3	0·85d.
Wages incurred in generation	97 10 0	0·35d.
Oil, waste, water, and engine-room expenses	23 0 0	0·084d.
Repairs and maintenance of engines and dynamos, and insurance	18 15 0	0·068d.
General expenses	2 10 0	0·009d.
Total cost	£373 12 3	1·361d.
Corporation charges at 4d. per unit	£1,088 2 8	
Carried forward (£161 1s. 3d. in 1903)	714 10 5	
Gross profit	875 11 8	

These figures are calculated on the Corporation charges of 4d. per unit for electricity. The day-load is about 50 amperes; and the night-load about 340 amperes. The plant is working with town gas costing 2s. 3d. per 1000 cubic feet; and, as seen above, last year's average cost per unit was only 1·361d. for lighting. We know of no local authority or ordinary company supplying electricity to private consumers for lighting at anything like this figure.

If vanity is a characteristic of the Norwich Corporation Electricity Committee, so also is business capacity. There was no doubt a little playing to the gallery just recently in the Council when Mr. Wild, the Chairman of the Electricity Committee, stated that whatever the Gas Company were doing in the matter of looking after the requirements of the poorer class of householders, they were merely following the lead of the Corporation Electricity Department. The Gas Company and their officials will smilingly allow the little vaunt to pass. The Gas Company are doing exceedingly well at Norwich—better than ever in fact; but, at the same time, Mr. T. Glover, the Gas Company's Engineer and Manager, would, we believe, be the first to say that in the Norwich Electricity Department he has found foemen worthy of his steel. We, too, have regard for the Norwich Electricity Committee; for they absolutely refuse to sacrifice their undertaking (as do many other Corporation Committees) for the sake of the little transient popularity gained by the mistaken policy of handing over something to the rates when the practice means the financial exhaustion of the concern. When the rates were being considered towards the end of June, success was obtained for a motion that the estimates should be deferred until it was ascertained whether the Electricity Committee could be prevailed upon to part with a "few thousands" of £6000 profit saved by them the past two years, and which they have prudently placed to a depreciation fund. When a Corporation Electricity Department do desire to act wisely and well, they have the greatest difficulty imaginable in resisting the propensity of the remainder of the Council for bleeding the undertaking. And not till Municipalities willingly recognize that in public as in private business the taking thought for the morrow is a valuable rule, shall we have municipal electricity supply run on proper lines. Many an electricity committee—the glory of those early "profits" handed over in aid of the rates with much trumpeting having passed away—wish that they had not been so precipitate, and that they now had them at their backs in solid funds to fortify their undertakings and business generally. Instead of producing glory, after a year or two, the profits are merely looked upon as a right by councillors and ratepayers alike. The Norwich Electricity Committee, however, have stood firm. The lucid and business-like defence of the action of the Committee by the Chairman at a later meeting of the Council did not leave the profit-grabbers a leg to stand upon, and the Committee will remain in undisturbed possession of their depreciation fund. One statement alone is an ample vindication. Since the Corporation took over the concern, machinery depreciation has arisen to the extent of nearly £4000! A point to be noted is that in the General Electricity Acts, 10 per cent. reserves are permitted; in the Norwich Act, power is given to reserve 20 per cent. This exceptional power it will not be amiss for the Committee to exercise before thinking of shedding their profits; and then it should be among the consumers, in order to augment the stability of the concern.

We have been reading an article in the "Bristol Guardian," in which the accounts of the Corporation Electricity Department, from the commencement of the undertaking until the present time—a period of a dozen years—are analyzed, and the results, together with the methods of the department's accountancy, are severely criticized. With the results, the ratepayers can be anything but pleased; for taking the whole twelve years, the most that our contemporary can find in the nature of profit is only some £2700, which is an exceedingly poor showing from a concern of such magnitude. If better success cannot be attained in a dozen years in a city like Bristol, what earthly chance have the hundreds of less important towns who have gone in, or are going into, electricity supply of making of it a really productive business, and effecting any lightening of the burdens of the ratepayers? At the end of March, 1904, the capital expenditure on the Bristol works exceeded (by nearly £43,000) half a million of money; what it is to-day, we cannot exactly say at present, but it must be getting on for £600,000. However, on twelve years' working, to have only a balance of profit of £2700 is anything but satisfactory; and if the increased cost that the citizens have had to pay for public lighting through electricity were set against this sum, then they would find that on this speculation on the part of the Corporation, they are an amount out of pocket which would rather astonish them. As the "Bristol Guardian" appears to be fond of arithmetical calculations, we offer this is a suggestion for a little further exercise. However, in the twelve years, the gross profits on the undertaking have amounted to £176,220. Of this, principal, interest, and other payments have absorbed £160,971; so that the net profits amount to £15,249. During the period, the undertaking has received support from the rates to the extent of £13,904; and, deducting this from the £15,249, we have only £1345 as the actual net profit. But there is a sum of £1398 appearing in the accounts as principal paid off; and the concern is credited with this—thus making the £2700.

So much for the profits. The succeeding criticism of our contemporary shows the shameless manner in which municipal

accounts are often "cooked" for the purpose of making them as fine in appearance as possible in the eyes of the ratepayers, to their detriment. In the past three years, the Committee have taken about £14,000 for depreciation from—not the current revenue account, but the net revenue account (contrary to the Accountant's view), with the double consequence that upon this sum about £700 has had to be paid in the shape of income-tax (which might have been saved), and that the ratepayers have had current revenue accounts presented to them showing a greater profit than would otherwise have been the case. Then the accounts also show that the Committee have, at the credit of the reserve fund, a balance of £10,000, when they have nothing of the kind. Under pressure, Alderman Pearson has stated that the sum in question is invested "in the unexhausted borrowing powers of the Committee," which is both amusing and contrary to the Act, which provides for the investment being "in Government securities, or in any other securities in which trustees are, by law, for the time being, authorized to invest . . . and accumulate it," &c. If the citizens of Bristol allow these things to continue, we shall be surprised at their confidence and supineness. Already nearly £600,000 is invested for the supply of 2677 consumers, and a great deal more money than is necessary is being paid for public lighting, simply to support this municipal concern. After all this, and the muddling up of the accounts in the manner disclosed, there is only a profit after twelve years of £2700! Let the ratepayers think over this, and having thought, then veto an increase of the municipal indebtedness in this direction, except for current necessities, until the undertaking has proved itself (without augmenting the ratepayers' burdens in public lighting) more worthy of extended support. Another suggestion may be made; and it is that Alderman Pearson should be asked to read at the next meeting of the Incorporated Municipal Electrical Association a paper on "Municipal Electricity Accounts, as Illustrated by the Twelve Years' Working of the Bristol Undertaking."

"Although the offer may appear to the shareholders somewhat inadequate, the Directors feel that, in view of the difficulties of the situation *both as regards manufacture and the ultimate value of the invention*, it should receive the serious consideration of the shareholders." These words refer to the Nernst lamp, and appear in a circular issued by the Directors to the shareholders of the Nernst Electric Light Company, Limited. The Nernst lamp has its advocates among electricians; and it has also those who disbelieve in it, simply because they cannot make anything satisfactory of it. Long ago, we came to the conclusion that the Nernst lamp has its simile in a delicate, spoilt child; and like most spoilt children, it is not, for any length of time, a favourite of many. Certainly it is not of the unlucky shareholders of the Nernst Electric Light Company, whose Directors have not only now, but for some time past recognized "the difficulties of the situation both as regards manufacture and the ultimate value of the invention." The Company was originally formed with a capital of £320,000, to acquire the patent rights for all parts of the world other than in Europe and the United States of America and Canada; and more than a quarter of a million of money was paid for the patent rights. The Allgemeine Elektricitäts-Gesellschaft retained the English and German patents; and the Nernst Electric Light Company had to continue to get their supplies of lamps from the German Company, as they could never master the turning out of a lamp in any way approaching a successful article on their own account. "The Electrician" six years ago (when the Nernst Company was floated) issued a strongly worded warning to the public; but the public paid little heed to it. Now the Company have agreed to accept an offer of £24,000 for the return to the original owners of the patent rights for which they paid £270,000. Of the £24,000 the Directors and staff consider they should have £3000 as compensation for loss of office, and that the Liquidator should have a remuneration of £300. It is a bitter pill; but it is thought the best course is to swallow it. We are sorry for the shareholders; but if people will foolishly rush into a thing about which they know nothing, they must, of course, bear the consequences.

The British Electric Plant Company, Limited, are securing a little free advertisement out of the fact that they have obtained an order for the complete equipment of electric motors for the new gas-works of the Falkirk Corporation. The power is to be supplied from the Corporation electricity station; and it is said these gas-works are believed to be "the first in Great Britain to be completely and exclusively driven throughout by electric motors." If electricity is to be the only motive power in the works, then perhaps the statement is notable for that reason; but certainly it is not for any other. There are several gas-works in the country owned by local authorities with the electricity supply also in their possession in which electrical energy is used, and is charged at such a low price per unit as to make it economical for the Gas Department to employ it. In gas companies' works, too, electrical installations are not exactly uncommon things, owing to the convenience and suitability of this form of motive power for driving certain types of retort charging and discharging machinery, and for lighting purposes in buildings where any naked lights are a danger. Gas-engines are also found—for example, at the Hastings Gas-Works—demonstrating their usefulness for generating electrical current. On the whole, therefore, there is nothing very unique in what the British Electric Plant Company are about to do at the Falkirk Gas-Works.

THE GASLIGHT AND COKE COMPANY.

Half-Yearly Report and Accounts.

The following is the report on the working of the Company during the six months ending June 30, which, with the accounts (see p. 328), will be submitted to the proprietors on Friday.

The accounts for the past half year show that, after providing for the fixed charges, and setting aside £10,000 for the half year towards the redemption fund, in accordance with the provisions of the Company's Act of 1903, there remains a balance of £304,126. The amount brought forward from the previous half year being £248,192, there is a balance available for distribution of £552,319, out of which the Directors recommend a dividend on the ordinary stock at the rate of £4 8s. per cent. per annum, which will absorb £334,911; leaving the sum of £217,408 to be carried to the credit of the current half year.

The revenue for the half year was less in comparison with that of the corresponding half year of 1904 for the causes following: (1) A fall in the prices of residual products, more especially in that of coke; (2) the reduction of 1d. per 1000 cubic feet in the price of gas; and (3) a decrease in gas sales of 1·8 per cent.

An important event of the half year has been the passing, after prolonged negotiations, through the Committees of both Houses of Parliament, of the London Gas Bill. As was reported at the general meeting in February last, the three Metropolitan Gas Companies jointly, and the London County Council had respectively promoted Bills to carry out the recommendations of the Departmental Committee of the Board of Trade on Gas Testing in the Metropolis. The House of Commons Committee preferred the Bill brought in by the London County Council, and that Bill alone was proceeded with; but, on the opposition of the Companies, the London County Council withdrew the clause providing for a reduction of the standard price of gas by 1d. per 1000 cubic feet, which would have involved a reduction in the standard rate of dividend by 2s. 8d. per cent. per annum. The Bill as amended, while amply protecting the consumers, will afford the Companies a considerable measure of relief in regard to the method of gas testing.

The three Metropolitan Gas Companies jointly opposed the London County Council (General Powers) Bill, which contained clauses enabling the Metropolitan Borough Councils to wire premises and to supply electric fittings, and to borrow money for those purposes. It is gratifying to be able to report that these clauses have been struck out of the Bill. The necessary protective clauses have been obtained in other Bills affecting the Company's interests.

The Directors have to report that the annual contracts for the supply of coal have been made at prices somewhat below those of last year.

The proprietors will learn with satisfaction that the Corporation of London have decided to displace electric arc lighting in certain leading thoroughfares in the City, and to instal experimentally a system of high-pressure gas lighting.

The Court of Directors has been furnished by the several Engineers of the Manufacturing and Distribution Departments respectively with the usual certificates that all the Company's plant has been maintained in thorough efficiency.

SOUTH METROPOLITAN GAS COMPANY.

The Half-Yearly Report.

The meeting of shareholders in this Company is called for Wednesday of next week, when the following report of the Directors—with the statement of accounts, some particulars of which appear on p. 329—will be submitted.

The half-year's profit is only £7410 2s. 8d. short of the sum required to pay the dividend recommended by the Directors at the same rate as the last—viz., 5½ per cent. The small deficiency will be taken from the balance brought forward, which, after the further abstraction of £7291 13s. 4d. to be added to the reserve fund on account of the balance of dividend not paid in March last, will leave £22,299 18s. 10d. to carry forward. Considering the low price of gas—2s. per 1000 feet—the fall in the value of residuals, and the small increase of consumption in the mild winter months, though very good later, the Directors regard the result as very satisfactory. The reserve and insurance funds and the balance to be carried forward are now respectively £171,881, £103,748, and £22,299, or a total of £297,928.

The entry "Co-partnership, £42,091 19s. 9d.," for twelve months, of which £18,000 was charged on account in December, is so large a sum that the Directors feel it their duty to direct the attention of consumers, shareholders, and employees to this item in the accounts. It is the result of extending the principle of the sliding-scale to the employees, in the shape of a percentage dependent on the price of gas on salaries and wages. This triple partnership can only be justified if it tends to make gas cheaper, thus benefiting all three partners. If it were a gift, it would be at the expense of the consumers and shareholders, and therefore unjustifiable; but the Directors are glad to state their belief that it is earned by the better and more intelligent, careful, and interested working of the great majority of the employees, who now

have in ordinary stock, together with a relatively small amount on deposit at 3 per cent. interest, over a quarter-of-a-million of money in the Company. Nearly the whole of the large annual bonuses is invested in stock; thus giving the employees the direct interest of shareholders in promoting its welfare.

In 1891 a superannuation fund for the Company's officers was established on the principle of joint contributions. The Company, although practically responsible for the stability of the fund, never formally guaranteed it. The rules have recently been revised, and the Directors felt it right that the Company should definitely undertake the implied responsibility.

Two matters of great importance remain to be dealt with in the report. The first is the entirely new item in the balance-sheet, "Monazite sand suspense account, £19,143 7s. 2d.," which demands explanation. A vital necessity for the gas industry is a continuous supply of reliable incandescent mantles at a reasonable price. If the supply of mantles should be restricted, or the price materially increased, as may happen, the position of gas would be very seriously jeopardized, for to return to flat-flame burners would entail much trouble and great expense, and would be a disastrous set-back to gas lighting. Mantles are made of thorium—a rare earth, only found in workable quantities in monazite sand. The sand from which the thorium used in Europe is extracted is obtained in Brazil, and is in the hands of two concessionaries, who, as might be expected, are working together. They supply the sand to a group of Continental firms, who also work together, and are known as the Thorium Convention. There is a monopoly in sand and also in thorium, with the result that nitrate of thorium which two or three years ago was 34s., later 42s., is now 54s. a kilo. (a kilo. being equal to $2\frac{1}{5}$ lbs.), and a further advance is said to be probable. In 1903, when the seriousness of the position became known to the Directors, they sent an agent to Brazil to endeavour to obtain a concession to export monazite sand, but without result. The only other known deposits of the sand are in the United States; and last year a property containing monazite was introduced to the Company, which on examination and report by their agents was considered satisfactory, and a purchase was made. Plant for working is now being erected, and the Directors are assured that a supply of sand will shortly be on its way to this country. Further investigations show that the deposits of monazite are more extensive than the agents sent out by the Company reported as in sight; and the Directors have the satisfaction to state that their great anxiety as to the future supply of mantles is entirely relieved.

The second matter relates to gas legislation. For nearly forty years the requirements as to illuminating power and purity and the tests imposed on the three Metropolitan Gas Companies have been excessively and most needlessly severe, and have caused the responsible officials continual anxiety, not only without advantage to the consumers, but to their disadvantage, by preventing reductions of price. An extraordinarily sensitive test for sulphuretted hydrogen has caused a large waste of capital by necessitating the addition of 50 per cent. to the purifying plant. The reduction of some other infinitesimal sulphur compounds has now been proved to the satisfaction of the Departmental Committee of the Board of Trade, as we have always contended, to have been a mistake. By the London Gas Act of this session, a reasonable test for sulphuretted hydrogen is to be prescribed, the requirement to reduce the other sulphur compounds is abolished, which relieves the inhabitants of the neighbourhood of the gas-works of a great nuisance, and the test for illuminating power is to be made with a burner, not incandescent, that will produce the greatest amount of light from the gas supplied. The principle is right, but there is a condition interfering with its proper application that will probably require correction by another appeal to Parliament. The opportunity of settling once for all the method of testing the illuminating power of gas for the kingdom, although very near attainment, has unfortunately been postponed by the action of the London County Council. They always strenuously oppose the Gas Companies, apparently on the mistaken idea that anything proposed by them must be to the disadvantage of the consumers. The waste of the money of the consumers and the ratepayers has been enormous. From the year 1900 this Company's parliamentary expenditure alone, due almost entirely to the action of the London County Council, amounts to £23,253. Add the expenses of the other two Companies and those of the Council, and the total cannot be less than £60,000, the greater part wasted in parliamentary contests that ought to have been avoided. To this should be added the loss to the consumers from the resulting higher cost of gas, which, taken at the low figure of only 1d. per 1000 feet, amounts to very nearly £700,000 in the last five years. And for what has this money been wasted? The Council have lost on every point. If the public authorities could understand and believe that the sliding-scale unites the interests of the Gas Companies and the consumers, that the auction clauses ensure economy of capital, and that the active competition to which gas is exposed is the best and most effective protection to the consumers, they would perhaps consider that the friendly co-operation which the Gas Companies have long sought would be best for all interests.

The Directors cannot conclude their report without expressing their gratification that the three Metropolitan Gas Companies have worked unitedly; and to this joint action, and the valuable support and evidence of the Institution of Gas Engineers, the success in this session of Parliament is largely due.

THE GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 334.)

THE general tendency of the markets in the Stock Exchange underwent a marked improvement last week. From the commencement there were favourable signs, which continued to improve; so that from initial steadiness a distinct advance set in. The public came out of their shells and began to buy. Consols and gilt-edged investment stocks were in demand; and so things went along merrily, until the close was without a cloud. This meant a good deal, because it was settlement week and a fairly heavy one, when fresh business is not expected to be very brisk. The elevating factors were cheap money, and a conviction that peace would be brought about somehow. In the Money Market there was a good demand, which the abundant supply was well able to meet; and when the demand was satisfied, rates fell very easy. Discount was steady. Business in the Gas Market was of much the same character as the week before, being largely in the chief issues. But it was irregular—some days quite lively, while others were decidedly quiet. The general position was one of good, steady strength; there being hardly any changes in London quotations, and those were for the better. There was an attempt to depress Gaslight and Coke on Thursday when the report and accounts came out, and the quotation was lowered half a point; but it was put back again on Saturday. Business in the ordinary stock was active. On Friday, during the depression, $98\frac{3}{4}$ was marked, but other transactions were done at par. The secured issues were very much neglected. Nothing was done in the maximum; there was one bargain in the preference at $109\frac{1}{2}$, and two or three in the debenture at $88\frac{1}{2}$ and $89\frac{1}{4}$. South Metropolitan was much busier than usual; marked transactions ranging from $130\frac{1}{2}$ to 132. The debenture changed hands at from $89\frac{1}{2}$ to $90\frac{1}{2}$. A little business was done in Commercials; the 4 per cent. realizing $117\frac{1}{2}$ and $118\frac{1}{4}$, the $3\frac{1}{2}$ per cent. $112\frac{1}{2}$, and the debenture $85\frac{1}{2}$ and 86. Why the latter should go at these figures when the other two Metropolitan debenture stocks are fetching $89\frac{1}{2}$ and $90\frac{1}{2}$ is not apparent. The Suburban and Provincial group were quiet, of course. The rise in the Brentford dividend brought in no business. British changed hands at from $40\frac{1}{4}$ to 41. South Suburban ordinary marked $121\frac{1}{2}$ and 123, ditto preference 128 and $128\frac{1}{2}$, and ditto debenture 130. West Ham preference made $123\frac{3}{4}$. On the local Exchanges, Liverpools and Sheffields were higher. The Continental Companies were more active. Imperial was done at from 211 to $212\frac{3}{4}$, European fully-paid at $22\frac{6}{8}$, and Union at 109 and 110, with a quotation rise of two points. Tuscan debenture marked $101\frac{3}{4}$, and Cagliari $25\frac{1}{4}$ and $25\frac{5}{16}$. Among the undertakings of the remoter world, Bombay was done at $5\frac{6}{8}$, and ditto part-paid $5\frac{1}{4}$. Cape Town marked from $17\frac{1}{4}$ to $17\frac{1}{2}$, and South African $16\frac{1}{4}$. Buenos Ayres changed hands at from $11\frac{6}{8}$ to $11\frac{7}{8}$, ditto debenture at 96, River Plate from $12\frac{3}{8}$ to $12\frac{5}{8}$, Primitiva $5\frac{13}{16}$ and $5\frac{7}{8}$, ditto preference $5\frac{7}{16}$, and ditto debenture from $96\frac{3}{4}$ to $97\frac{1}{2}$. Melbourne $4\frac{1}{2}$ per cent. marked $103\frac{3}{4}$ and 104, Monte Video $11\frac{1}{4}$, and Ottoman $6\frac{3}{16}$.

The closing prices are shown in our Stock and Share List on page 334.

COMPOSITION OF COAL AND ITS RELATION TO GAS PRODUCED.

Co-Ordination in Testing.

IN the "JOURNAL" for the 11th ult., we drew attention to the important contributions which had recently been made in our columns to the subject of the testing of coal for gas-making purposes. Especially did we refer to the lecture of M. Sainte-Claire Deville giving an account of many years' work at La Villette Experimental Gas-Works. In his previous utterances, M. Deville has pointed out the fact that oxygen is an important constituent in its influence upon the gas-making properties of coal; and he now continues his classification upon this basis. So far as we are aware, however, the recent lecture is the first occasion on which he has made reference to the bearing of the oxygen in coal upon the production of water gas in the ordinary process of carbonization. He does not explain the action, or give any idea of its magnitude; and we particularly direct attention to the question now because it might otherwise escape the attention of our readers. Not only is it desirable thus to lift it above a mere casual reference, but we wish to state that, before we published our translation of M. Deville's lecture, we received from the pen of Mr. Thomas Holgate a manuscript which, among other matters, deals at length with this important consideration.

Such coincidences of independent investigation or discovery are not rare; but it is desirable that such parallelism in working, when it occurs, should be duly announced. A careful study of M. Deville's lecture will show that assumptions are made, and averages taken, which need to be accepted strictly within the limitations explained by him, and require to be supplemented by the detail information from which the generalizations are derived. Some idea of the extent to which M. Deville's conclusions may be considered of general application may be gained by the perusal of the series of articles referred to, which we hope to publish at an early date. For many years the Paris Gas Company have

possessed an experimental station where a large amount of valuable statistics have been compiled; while for a much shorter period the Berlin Municipal Gas-Works, in the person of Professor H. Drehschmidt, have been similarly engaged. While there is much in common between the classification adopted by M. Deville and Herr Drehschmidt, there are differences which make a comparison almost impossible.

If the two experimental stations mentioned could be brought into uniformity, and a similar course of action adopted at the Birmingham station, under Mr. Hack and Mr. Davidson, an international work would be in progress from which valuable information could be obtained. It will be seen that M. Deville's mode of stating results is capable of improvement, to mention only one —viz., the grouping of nitrogen with methane; the last-named gas being inadvertently stated as formic acid (p. 112) and formene (p. 113). Not only is the method of statement capable of amendment, but the effect of temperature and other conditions of distillation is overlooked in the conclusions drawn. The discussions at the recent meeting of the Institution of Gas Engineers revealed the fact that many figures are required to give convincing proof of an increase in the results following a change of distillation methods. Not only so, but if certain crucial factors are omitted they cannot be atoned for by a multiplicity of others of less significance.

The practical value of the work done in these experimental stations will depend entirely upon the accuracy and completeness of the returns, and therefore it is necessary not only to test a large number of samples of coal, but to examine each one, and the gas resulting therefrom, with the utmost skill. In other words, it may be said that it is as important to know what to test for as to do the testing itself. The time is ripe for an advance along the lines we have suggested; for the improvements in the apparatus and the methods of gas analysis, as well as in the means of ascertaining temperatures, that have been made in recent years enable quick and accurate results to be obtained where formerly they were slow and unreliable. If these improvements are made use of, many chemical actions formerly regarded as obscure may now possibly be made plain, and we may venture to hope for considerable accessions to our knowledge of the distillation of coal. Towards this advance, co-ordination in methods of testing is an important step; and anything we can do towards securing it, will gladly be performed.

GAS COMPANIES AND THEIR CUSTOMERS.

Some remarks which were made at the recent inauguration of the Ilfracombe New Gas-Works, respecting the relations existing between the District Council and the Gas Company, had a decidedly pleasant ring. The Council and the Company stand upon such excellent footing that both are content with things as they are, and apparently would be equally content if circumstances should lead to the transfer of the gas undertaking from the Company to the hands of the Council. This good feeling is the natural outcome of the knowledge that both the Gas Company and the Council are animated by a desire to do their best for the town. The history of the Gas Company is the history of the development of Ilfracombe. It is bound up with the fortunes of the town, has grown with its growth, and has contributed in no small degree to its prosperity. The men who are mainly interested in it, and who guide and control its destiny, are interested equally in everything else which is for the advancement and benefit of the town. Being in touch with local affairs, they not only recognize themselves that what is for the public good must be good for the Gas Company, but have also brought the Local Authority to see that it is to their advantage to recognize in the Company an institution which in its way contributes no little to the comfort and pleasure, and therefore to the prosperity, of the community.

It is not unusual for the directors of gas companies to be intimately associated with the public life of the towns and cities in which they live. Indeed, in many cases they are among the most prominent and public-spirited citizens, and take a full share of the labour and responsibility associated with the carrying on of local institutions. Where this is the case, it is no doubt to the advantage of the local gas company. Such prejudice as has grown up against gas companies is largely the outcome of a feeling that they exist less for the public good than for the enrichment of the shareholders. Monopolists cannot expect to secure a large measure of public favour; and though gas companies do not now enjoy a monopoly in any real sense of the word, they are apt still to be regarded, if not with hostility, at all events with no particular favour. So far as the public at large is concerned, there has no doubt been an improvement in recent years in their attitude towards gas companies. For one thing, the number of shareholders in gas undertakings has considerably increased. The encouragement which some companies offer to their customers to become partners in the business which they support, has brought in a large number of small investors, and has widened and enlarged the gas companies' circle of friends. Then the greater publicity which gas affairs now receive, in one way or another, has helped to a proper understanding of the position of the companies. Time was when all that most people knew of the gas company was that it meant an occasional visit from a man who did something mysterious to the meter in the cellar, and another visit about quarter day from the collector of the gas account. The result was that the gas company came to be associated mainly with the payment of accounts; and its repesentative was about as popular as the rent-collector or the tax-gatherer. Thanks to the development of incandescent gas-lighting, to the great advance which has been made in the use of gas stoves and fires, and to the invention of the automatic meter, a good deal of this old prejudice has now passed away. The business of gas companies is no longer transacted in obscure corners amid dingy and sordid surroundings. In most places the gas company's show-room is conspicuous among the business establishments of some main street; and the company, instead of seeming to shun publicity, courts it by every means in its power. All this is manifestly for the public good, as it is also for the advantage of the gas industry. Competition has taught the lesson that business must be pushed; that customers must be sought if they are to be secured; and that when secured their desires and wishes, even their prejudices, must be studied if they are to be retained.

This is leading us perhaps a long way from Ilfracombe, though it is really applicable to the lesson which was enforced there. What it amounts to in a word is that gas companies best serve their own interests by studying the interests of the public. It is good that they should have directors who take part in public affairs, that they should be men enjoying the favour of their townsmen, and capable of looking at questions in a broad and sympathetic spirit. It is equally desirable that the interests of the individual consumer should be studied, and that he should be made to feel that the gas company is ready and willing to give him advice and assistance in putting gas to the best and most economical use. Electric light companies, in their anxiety to establish a footing, do not despise such aids as are to be derived from advertising; and on occasion, they will tout for business in a manner which to the gas man seems in places a little undignified and degrading. We do not think these methods call for imitation. Gas is quite capable of holding its own against the competition of electricity or anything else, whether for lighting, heating, or power; and no one need stoop to any unworthy device in order to establish this fact. At the same time, it cannot be doubted that it is to the advantage of a gas company to be on good terms with the local authorities and with the consumers individually and collectively. The Ilfracombe Gas Company have a lesson for other undertakings in the excellent relations which exist between them and the District Council. No doubt, it is to some extent a matter of *personnel;* but no company can lose anything by making it clear that it is willing to do what it legitimately can to promote the interests of its town and add to its prosperity.

THE BUDGET OF THE WATER BOARD.

In the comments we have made from time to time on the Metropolitan Water Question, we have been careful not to express any strong conviction that either the consumers or the ratepayers would be greatly benefited financially by the transfer of the water supply to a public body. We quite recognized that the change would enable economy to be effected in certain directions; but, on the other hand, it seemed that there would be some additional outgoings which would absorb the savings, and possibly leave a balance on the wrong side. The Board have now been in possession of the water-works for a year, and have lately submitted their first budget, covering the twelve months ending the 31st of March, 1906; and we are pleased to find that, notwithstanding some heavy expenditure, the estimated surplus is given as £36,165. The net income from all sources is put down at £2,758,500, and the expenditure at £2,722,335. Unfortuuately for the Board, there has, with one exception—the quinquennial year 1901-2—been a decline in the increase in the gross income from water-rentals during the past few years; for while in 1899-1900 the increase was £76,048, in the year 1903-4, it was only £49,365, and for the current financial year it is reckoned to be £46,181. Including the quinquennial year, the average increase is £67,383; excluding it, the average works out to £61,315. Comparing the increase of £47,365 with this amount, the difference is £13,950. The gradual falling off in what might be called the normal growth of income due to new property is attributed in large measure to stagnation in the building trade.

The estimates, which were passed by the Board at their meeting on the 21st ult., were accompanied by a memorandum by the Comptroller (Mr. F. E. Harris), in which he shows that the rates and taxes reckoned for are more by £29,000 than they were for the year 1903-4. This is an abnormal expenditure in relation to income, due, among other things, to higher assessments to the amount of £11,204, and to new assessments (including the Staines reservoirs) totalling to £14,846. Then the estimated expenditure includes a substantial item for compensation and superannuation allowances. In 1903-4, the figures were £21,650; whereas for the current year they are put at £41,065—an increase of £19,415. This was inevitable, as the result of the re-organization of the staff. Mr. Harris points out that this expenditure may be regarded as quite abnormal; and, of course, in time it will disappear entirely. Many offices have been abolished; nevertheless there is an increase of £15,824 on the expenditure for 1903-4, or an abnormal expenditure in relation to income of £10,201. It is explained that the principal increase is the inclusion of the whole

of the salaries of the Board's engineering staffs; whereas the Water Companies charged a substantial portion to capital. As, however, the Local Government Board never allow expenses in respect of the salaries of permanent officials to be so charged, the Finance Committee of the Water Board came to the conclusion that the whole cost should be placed to revenue account.

In examining the financial position of the Board, it must be borne in mind that they have to bear a heavy burden in the shape of debenture interest. The amount provided for the current year shows an increase of £29,688 on the corresponding expenditure in 1903-4; and it is due to the fact that a very large amount of additional debenture stock was issued by the Water Companies during 1903 and in the period therefrom up to the "appointed day." In the year ending March 31, 1903, no less than £1,181,015 was raised on debentures; while between that date and June 24, 1904, this total was increased by £1,159,065. In rather more than two years, therefore, no less than £2,340,080 of debenture stock was placed on the market, to be taken over by the Board; whereas from 1895 to 1900 the greatest amount issued in one year had been £970,000. Mr. Harris points out that if the Companies had continued to exist, they would have had to meet a very much greater relative charge for interest than they had previously done, as the full effect of the recent issues would have fallen on the years from 1905 onwards. The interest on the debenture stocks and on the Board's "B" stock, the cost of managing the water stock, and the sum required for the compulsory redemption of debt, amount altogether to £1,474,963. Adding the estimated surplus of £36,165, we get a total of £1,511,128. This figure may very properly be compared with the debenture interest, Directors' fees, the payments to the Chamberlain's fund, and the net profits of the Water Companies available for dividends, for the year 1903-4—viz., £1,514,833. As the result, a reduction is shown of £3705. This is exactly the difference between the increased income for 1905-6 of £89,198, and the increased working expenses of £92,903.

On the whole, the first budget of the new Board must not be criticized too severely. It is true that the working expenses are very much higher than the public were led to expect they would be—being 45·22 per cent. of the estimated income, against 43·25 per cent. in 1903-4; but it must be borne in mind that the Board have had to get into working order, and control a necessarily complicated business. Next year, with further experience, they will, it may be hoped, be in a position to present a better financial statement than the one under notice.

OBITUARY.

The death occurred suddenly last Tuesday week, at Carrick Grange, Sevenoaks, of Mr. W. Bruce Dick, the founder of the engineering firm of Messrs. Dick, Kerr, and Co. Deceased was 75 years of age.

Mr. W. Chalmers, Gas Manager to the Corporation of Alva, died on 23rd ult., after a long illness. He was 57 years of age. After having been in the gas-works at Lanark and Carluke, he was appointed Manager at Alva in 1887. During his tenure of office there the works were greatly improved and modernized. He is survived by a widow and family, one of whom—his son Robert—has carried on the works during the past few months.

PERSONAL.

The election is announced of Mr. Dugald Clerk, M.Inst.C.E., as President of the Junior Institution of Engineers for the ensuing session.

Alderman Robert Gibson, the Chairman of the Manchester Gas Committee, last Tuesday underwent an operation, which we are pleased to learn was satisfactorily performed.

Reference was made last week to the relinquishment by Mr. Charles Read of the position of Secretary and Manager of the Redhill Gas Company, and the appointment of Mr. James Paterson, M.A., as his successor. On Mr. Reid's resignation being laid before the Board, it was received with great regret; and the Directors placed on record, in the form of a resolution, their high appreciation of the "earnest zealousness and faithfulness" with which he had performed his duties during the 33 years he had been in the service of the Company, and expressed the hope that he might long be spared to enjoy the rest he had so well earned.

It is stated in another column to-day that among the Directors of the South Suburban Gas Company who were absent from last Thursday's "Co-Partnership Dinner" at the Crystal Palace was Mr. Charles Hunt, who was prevented by indisposition from attending. We regret to learn that Mr. Hunt has been seriously ill with pleurisy and pneumonia; and though he is decidedly better now, he is likely to be confined to the house for the next few weeks. The attack is particularly unfortunate at the present juncture, as Mr. Hunt was due to sail at the end of last week for South America; his intention having been to visit Monte Video and other Brazilian cities.

THE DUTCH ASSOCIATION OF GAS MANAGERS.

Thirty-Third Annual Meeting—Amsterdam, July 11 to 13.

(*Concluded from p. 235.*)

The last paper dealing with the Amsterdam Gas-Works was that of Heer J. Diephuis, the Chief of the Distribution Department. The information he furnished in regard to the organization of his department was exceedingly interesting, not only on account of the figures he submitted, showing the progress and present condition of the service, but also of the agreeable manner in which they were brought forward. Commencing with a compliment to his colleagues of the Manufacturing Department for their communications, he said it was really his department that caused them to make such extensions and improvements in their works and to erect such large gasholders, which were scarcely big enough to deliver sufficient gas through the many outlets for it which he made in the mains. He then proceeded to give some statistics, from which the following particulars are taken.

Statistics of Distribution at Amsterdam.

The number of ordinary gas-meters fixed on Aug. 10, 1898 (the date when the gas supply passed into the hands of the Municipality), was 23,864; and on Dec. 31, 1904, 37,404. The number of prepayment meters in use on Aug. 10, 1898, was 916; while on Dec. 31, 1904, it was 25,203. No less than 64 fitters' carts are employed every day to put in new slot installations; while the number of hands employed for this service is about 150. The length of the mains is at present 359,830 metres (393,515 yards); and their contents is 13,935 cubic metres (492,000 cubic feet). Though a 22-inch feeder was laid two years ago from the East Works directly to the southern part of the city, and many other enlargements of existing mains have been executed, all this has failed to afford a satisfactory supply of gas during the "peak of the load" in the outer district; and therefore there is to be laid this year a 36-inch pipe of a length of 8300 metres (9077 yards), which is intended to encircle the city, and connect the two existing works, and subsequently the projected third works on the River Amstel. Eventually this feeder will be charged with gas under high pressure. The pipes will be constructed of Siemens-Martin mild steel, and will be 33, 26, 16½, 10, and 8 feet—some of them even 72 and 46 feet—long; the thickness of the metal being about $\frac{7}{16}$ths of an inch. The estimate of the total cost of material and laying amounts to 550,000 fl. (£46,000).

Miscellaneous Items on the Agenda.

After the officials of the Amsterdam Gas Department had been thanked by the President for their communications, the members proceeded to engage in a conversational discussion of about twenty items on the *agenda*, the first of which was as to what experience had been had with certain newly-introduced gas coals. With regard to the Garesfield coal, it was said that, so far as the yield of gas and coke was concerned, it could be classed under good gas coals. The information afforded as to coal from the Gladbach Colliery was less favourable; but it should not be forgotten that the working of this mine has only been of recent date. The Lambton gas coal, imported during the last German strike, has in some respects given satisfaction; but any recorded results could not yet be shown.

Another item had reference to the De Brouwer charging and discharging machinery and the wear and tear of mechanical coke-conveyors; and in considering it allusion was made to all that had been said by Heeren Muller and Geerling, as already stated. It was thought that the invention of M. de Brouwer might be considered of great importance, and probably as being capable of superseding inclined retorts, provided the installation was improved in certain details. Referring to the paper read by Heer Geerling, Heer Levert asked if the mechanical conveyance of coke could be made suitable for small gas-works—those, for instance, with an annual production of about 70 million cubic feet—whereupon the President replied that he had dealt with this question in his report presented at the meeting of the Association at Haarlem in 1903, when he came to the conclusion that for this production and upwards the mechanical conveyance of coke is desirable.

The next item on the *agenda* referred to the estimation of the value of carburetting oil for water gas; and the opinion was expressed that it was valued mainly by the specific gravity, the results of fractional distillation, and its more or less volatility. It was pointed out that for oil from different sources, the carburettor should have a distinct temperature. Several members said they used for testing the oil an apparatus for its fractional distillation, under a vacuum of 27½ inches of mercury, of which the dimensions of all the receptacles, condenser, &c., were determined. While some of the speakers stated that ·890 was the limit of specific gravity, Heer van Mierloo, of Tilburg, argued that thes pecific gravity of American oil was not more than ·850, and that of Galician oil ·885. In his opinion, the American oil should be 5 per cent. more economical for carburetting purposes than other oils. It was further mentioned that the maximum amount of sulphur should not be more than ½ per cent. Finally, Dr. Stoffel said he considered the calorific value should also be a factor for consideration in estimating the value of oils.

A question arose as to how to get the best value out of the tar produced in the manufacture of carburetted water gas; and it caused a lengthy discussion, from which it appeared that selling the tar was better than using it as fuel.

Heer F. A. van der Welligen (of Messrs. Humphreys and Glasgow) said that water-gas tar was employed for different purposes—for instance, it was burnt under the boilers, used for painting ships and ironwork, and for preserving wood. The average price at the present time was 1·45 fl. per 100 kilos. (1s. 3d. per cwt.), and it was mostly sold to tar distillers. One of the most economical methods of dealing with this tar was that employed at the Hague—viz., distilling it by means of the exhaust steam from the boilers of the water-gas plant, whereby there was obtained, first, a waterless and also a more valuable tar; secondly, oil which might serve for naphthalene washing, it would dissolve at ordinary temperature 27 per cent. of this deposit; and thirdly, dregs, which up to now had been considered useless and burdensome, but which might be employed for making dustless yards and roads. Heer W. Niermeyer (Arnheim) said he bought water-gas tar from the gas-works at Utrecht, and with it washed the naphthalene out of his gas. When the tar contained from 10 to 12 per cent. of naphthalene, it was soaped and used as Westrumite.

The next question was as to what experience there had been with the use of the tar emulsion produced according to the recipe of Heer N. C. Hoogvliet, who has tried to render roads dustless by means of a mixture of tar and water. Heer Levert (Apeldoorn) said he had applied the mixture, prepared according to the following instructions of Heer Hoogvleit: In every 100 litres of tar, 6 kilos. of soft soap and 6 kilos of calcinated potash are dissolved; and to this are added 100 litres of water, and mixed with a mechanical stirring apparatus. (The English proportions are 100 gallons of tar, 60 lbs. each of soap and calcinated potash, and 100 gallons of water.) When the mixture is to be used at once, it should be diluted to about five times the original volume of the tar. This quantity is put in a watering-cart, and, by means of steam, heated up to boiling-point, after which it runs easily out of the sprayers of the cart. During transport the liquid should be steadily stirred. At Apeldoorn, two squares are treated in this way. The expenses for a surface of 2400 square metres (2870 square yards) amount to:

	Florins.
500 litres of tar, at 2 c. per litre	10·00
30 kilos. of potash, at 4 c. per kilo.	1·20
30 kilos. of soft soap, at 15 c. per kilo.	4·50
Wages	4·30
Total	20·00

Converted into English, the figures stand thus:

110 gallons of tar, at 15s. 1½d. per 100 gallons	16s. 7½d.
66 lbs. of potash, at 3s. per cwt.	2 0
66 lbs. of soft soap, at 11s. 4d. per cwt.	7 3
Wages	7 2
Total	33s. 0½d.

or at the rate of 1s. 2d. per 100 square yards.

With this quantity, the two squares remained dustless during four weeks. After this period they were again covered with a more dilute emulsion, costing 10 fl. (about 16s. 8d.) Heer Levert pointed out that the road should be cleared of dry dust, so as to enable the emulsion the better to penetrate into the ground; that during its use the road should be closed for traffic for 24 hours till the surface is dry; that the spraying should be done in dry weather; and that the mixture should be applied as hot as possible. If the roads are some distance from the works, heating apparatus should be carried on the cart. The President said he also had made a trial of the tar mixture on a gravel road at Maastricht, and it partly failed, because the surface was not left sufficiently long to harden. He noticed, however, that the road had been dustless for some time; and therefore he would have another trial.

The next item consisted of the following question: "Is it advisable to mix new oxide of iron with 5 per cent. of spent material to render it more capable of absorbing sulphuretted hydrogen?" In answering, most of the members appeared to think it was quite superfluous. Heer J. J. Prins van Doesburgh (Gouda) said everything depended upon whether the new oxide had affinity for sulphuretted hydrogen. If the oxide was of good quality, it had a proper affinity.

Another question was: "How can we best utilize anthracene oil saturated with naphthalene in the washer?" It was generally agreed that the best way to make the oil profitable was to let it flow into the tar-tank, as this tended to bring up the price of the tar.

The next points discussed were: "What should be the annual production of gas-works to allow of the working up of the ammoniacal liquor with profit, in view of the present quotation for sulphate?" "What system of treating gas liquor is to be most preferred for small works?" "Which installations can be recommended for this purpose?" An animated discussion took place upon them. Notwithstanding that some members recommended the manufacture of sulphate of ammonia for works having an annual production of about a million cubic metres (35·3 million cubic feet) of gas, or even less, others thought it far better and simpler (even those who had formerly made sulphate) to concentrate the liquor and sell it in this condition. It was generally agreed that the high cost of carriage of the ordinary liquor was keeping down the selling price too much. Heer E. Blum (Director of the Berlin Anhaltische Maschinenbau Actien Gesellschaft) expressed the opinion that for small works, even for those with an annual production of only 300,000 cubic metres of gas, it was most advantageous to concentrate the liquor to a strength of ± 25 per cent., and to sell it. Heer Boissevain, one of the Directors of the firm of Heeren van der Elst and Matthes, who take the gas liquor from a number of gas-works in Holland for the manufacture of sulphate, said that many gas managers in their calculations overlooked certain expenses. For instance, they did not put down anything for wages, because the stoker did the work in his spare time, nor did they charge for their repairs, because they had a smith for their gas-works, who also did any repairs necessary to the sulphate plant. For getting a proper working balance, however, all cost should be brought into account; and the amortization of the sulphate plant should not be taken at too low a figure. If this were done, other results would be shown. The weak point for his firm was the cost of transport of the original liquor; and it would be advisable for all managers to concentrate it to a strength of 15° to 18° Beaumé.

In closing the conversation on the subject, the President said the conclusion he had come to was that it was advisable for everyone who had sulphate plant to make out a proper working account, and to book all items of revenue and expenditure, together with a proper amount for interest, sinking fund, &c. If this were more generally done for a period of a year, they would have a better oversight of this matter.

The next question of interest was as to the practical results which have followed the introduction of different automatic lighting devices. The President gave a demonstration of his invention, which was installed in the meeting-room by the Dordrecht Gas-Meter Works. This apparatus has no intricate mechanism, and only works by increase of pressure, which actuates fluids, and shuts off or liberates the gas. The fluids do not freeze.

The question of how to deal with persons poisoned by gas was discussed by Heeren Asselbergs, van der Horst, and Salomons. Heer Asselbergs showed a small, simple apparatus for the supply of oxygen, and said that this gas was used far more in Belgium and Germany than in Holland. Heer van der Horst remarked that in Amsterdam oxygen appliances were to be seen everywhere. Heer Salomons pointed out that patients should not be made to walk nor should they be laid in a current of cold air.

The proceedings concluded with the usual votes of thanks. It was announced that the meeting next year will be at Apeldoorn, the charming summer residence of the Queen of Holland.

TESTING COMMERCIALLY-PURE BENZOLS.

In the "JOURNAL" for Oct. 4, 1904, p. 40, we gave an account of work done by various experimentalists in determining the amount of sulphur in benzene. The injury caused by the enrichment of coal gas with benzol containing either carbon bisulphide (CS_2) or thiophene (C_4H_4S) has caused makers to endeavour to free their product from these impurities; and the degree of success is shown by some recent analyses by Carl Schwalbe. Some of the samples tested were intended for the manufacture of aniline, and one (No. 6 in the table) was marked "purissimum krist. thiophen-frei pro analysi." 2·625 parts by weight of thiophene are equal to 1 part by weight of sulphur.

Consecutive number.	Total Sulphur. Per Cent.	Sulphur as Carbon Bisulphide. Per Cent.	Thiophene by Difference between Total Sulphur and Sulphur as Carbon Bisulphide.	Thiophene by Dimrot's Method. Per Cent.
1	0·036	0·022	0·039	0·038
2	0·027	0·001	0·069	0·061
3	0·039	0·021	0·047	0·073
4	0·021	0·019	0·005	0·019
5	0·060	0·011	0·127	0·171
6	0·010	0·010	nil	nil
Average.	0·032	0·014	0·048	0·060

Liebermann and Pleus have stated recently that the nitroso reaction will only detect thiophene with certainty within twenty minutes, when at least 0·12 per cent. is present.* As the average proportion of thiophene is 0·26 per cent. in commercial benzols and 0·04 per cent. in pure benzols, Schwalbe regards it as preferable to use the isatin reaction to detect thiophene in the latter. A method for the determination of thiophene which is simple, rapid, and perfectly trustworthy has not yet been devised.

* See "JOURNAL," Vol. LXXXVIII., p. 40.

The Massachusetts State Legislature have instructed the Board of Gas and Electric Light Commissioners to investigate the working of the sliding-scale system; and the Chairman (Mr. Forrest E. Barker) and two colleagues are now engaged on the matter.

DEVELOPMENTS IN MACHINERY FOR TRANSMITTING MATERIALS.

By Gilbert Little.

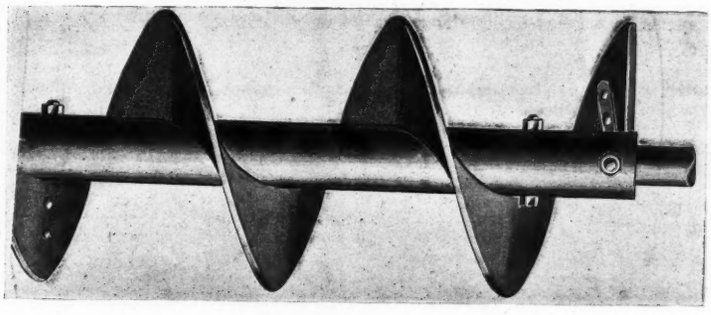


Fig. 1.

Until near the beginning of last century, industrial progress was strangled by the impossibility of transmitting materials from one part of the country to another; and as any marked development in commerce was impossible until men could find the means of conveying commodities from the place where they were produced to the place where there were people willing to make use of them, it is not surprising that, when this fact became generally apparent, in fourteen years—from 1760 to 1773—no less than 452 Acts of Parliament were passed for the improvement of roads and highways. A few years later, the same desire to improve the methods of transferring goods and manufactures created in Great Britain a passion for forming canals, which quickly passed into a species of mania; and before the century closed, the country was provided with such length of water-carriage way that commerce was no longer entirely repressed by the difficulty of conveying goods, and a vast expansion of trade was the result.

The expansion of manufactures which followed these improved roads and canals, again called for more easy and speedy transit of men and materials. The steam-engine was the agency by which it was to be supplied on both sea and land; and the free personal intercourse so essential in the conduct of business enterprise was made possible by the splendid conceptions of steam locomotion and steam navigation. A fresh impetus to improving our modes of transit became again apparent between 1860 and 1880; and the inventive and practical business minds of the country were as keenly as at any former period glowing with the desire to improve the means of transport, diminishing space by notable bridges, bringing the distant places of the earth together by swift steamers, and improving inland water-carriage by ship canals.

About 1885 less prominent, but not less valuable, labour-saving contrivances were introduced for shortening processes of labour and improving the modes of transit in works and factories, and an unlimited possibility of improvement speedily revealed itself in this direction for all our industries. Instead of seeing finality in the progress reached in mechanical conveying and elevating appliances, the point only was perceived from which an improving era of progress could take its opening, and remove the debilitating restraints on trade—the chief of which is still the labour

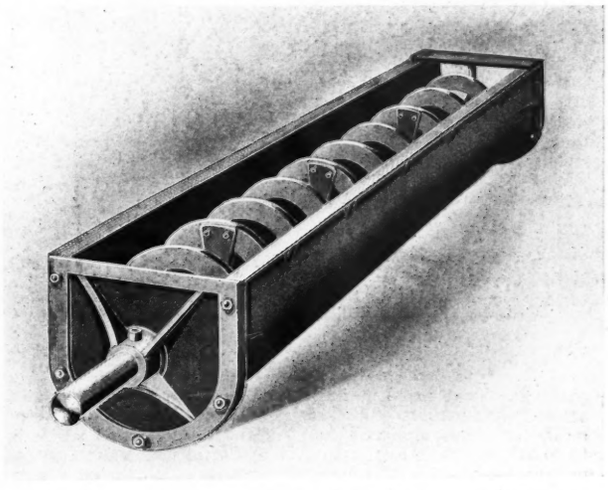


Fig. 2.

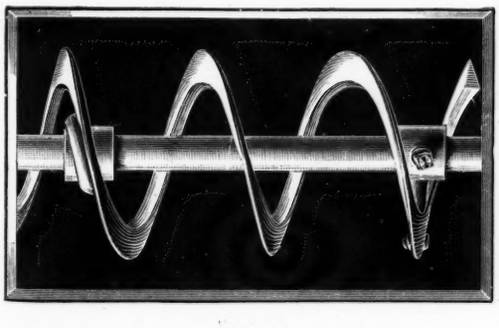


Fig. 3.

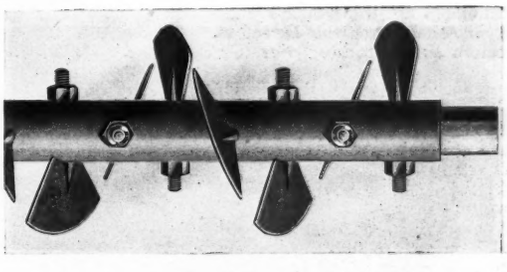


Fig. 4.

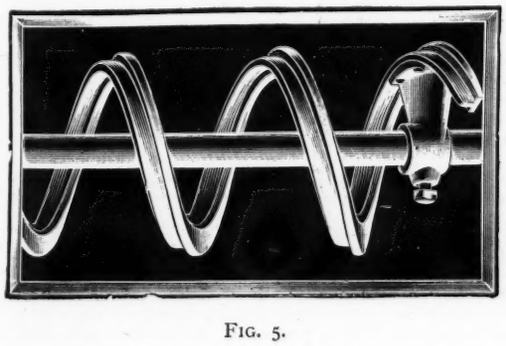


Fig. 5.

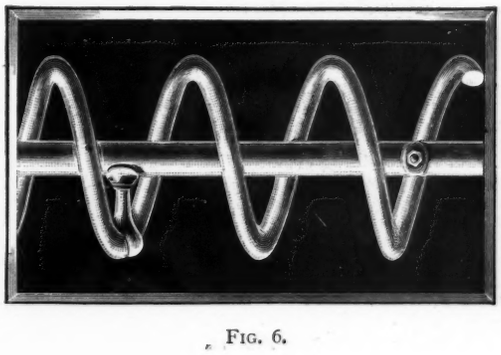


Fig. 6.

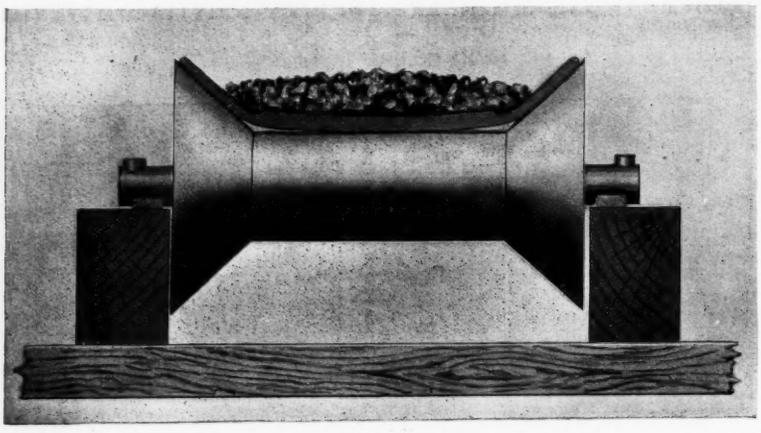


FIG. 7.

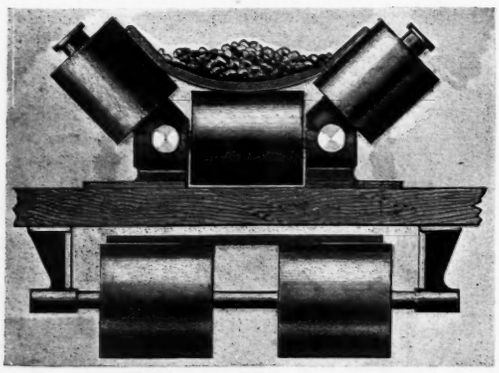


FIG. 8.

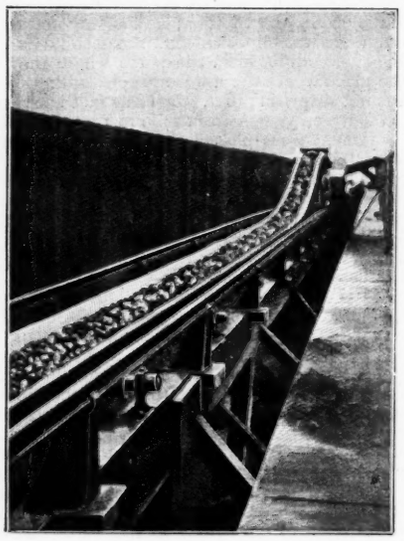


FIG. 9.

problem. That problem has forced itself largely to the front among the members of the engineers' societies, and owners of mills, workshops, and collieries; and the object of this article is to invite attention to the subject of the mechanical transit of materials by means of conveyors, through which the conveying and elevating of almost every kind of material is rendered practically labourless, although the wheelbarrow is still in many districts of England too much in evidence.

Thirty years ago employers and owners of works were capitalists, who, by careful management, or some good patented apparatus, saved or made fortunes. In present-day workshops, mills, and factories the shareholders are the bankers who entrust their investments to the Directors. The Directors aim at turning over the capital as many times as possible during the year, and earning reasonable dividends. Modern engineers have realized that the safest way to ensure dividends is to put down the best labour-saving devices, and automatically shift all kinds of materials and products from where they are to where they are wanted. Hoists, travelling cranes, and trolley tracks abound in all well-equipped machine-shops; and the devices now at the command of civil engineers have replaced unskilled labourers by thousands. The automatic carrying of materials has during the last twenty years been an attractive field, and become a distinct branch of engineering. The diversity of elevator and conveyor appliances can be best illustrated by giving a few examples of the earlier and the present-day designs.

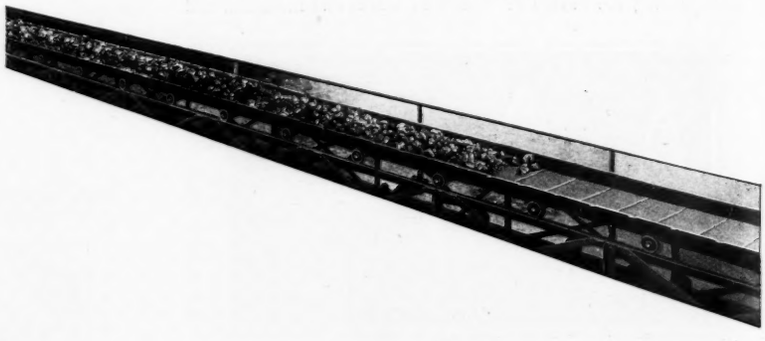


FIG. 10.

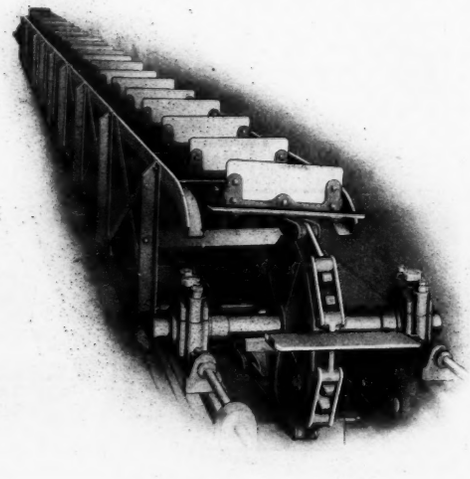


FIG. 11.

The first-known appliance for conveying or propelling materials was the screw or spiral, invented by Archimedes, 260 B.C. For the transport of seed, corn, sugar, and dusty things, it is still a useful type of conveyor. For sticky materials, the paddle-blade screw was introduced about a hundred years ago. It is used largely for mixing purposes. About the same date (1788)

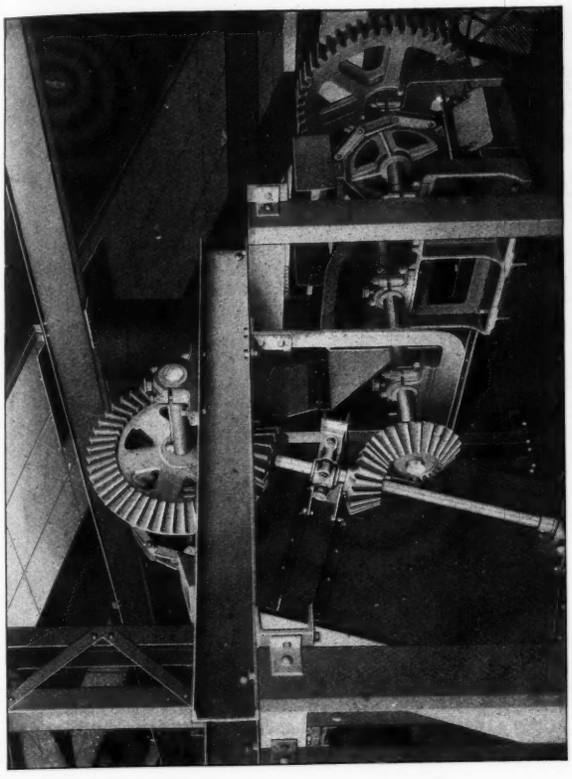


FIG. 13.

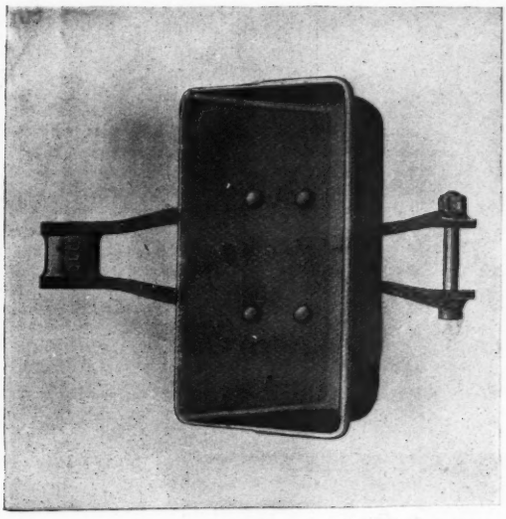


FIG. 16.

FIG. 14.

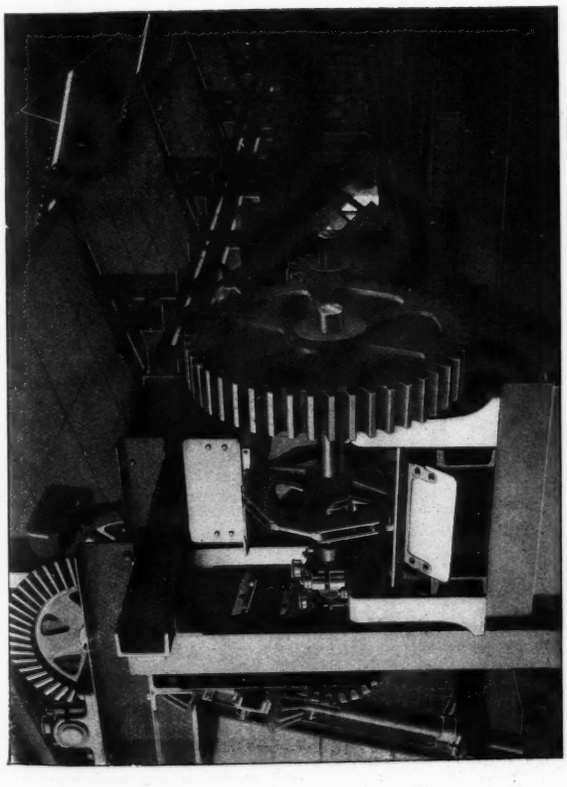


FIG. 12.

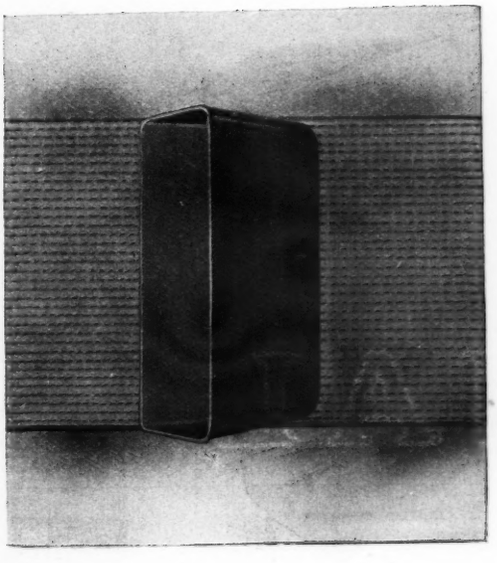


FIG. 15.

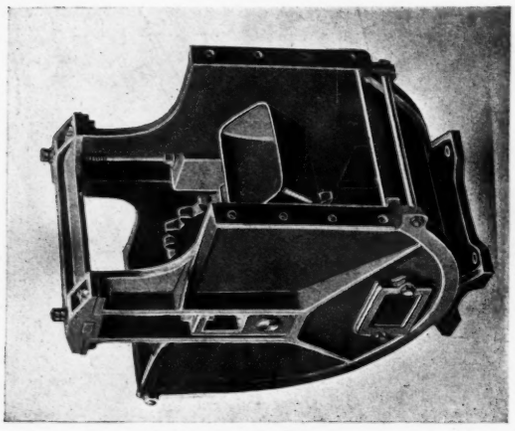


FIG. 22.

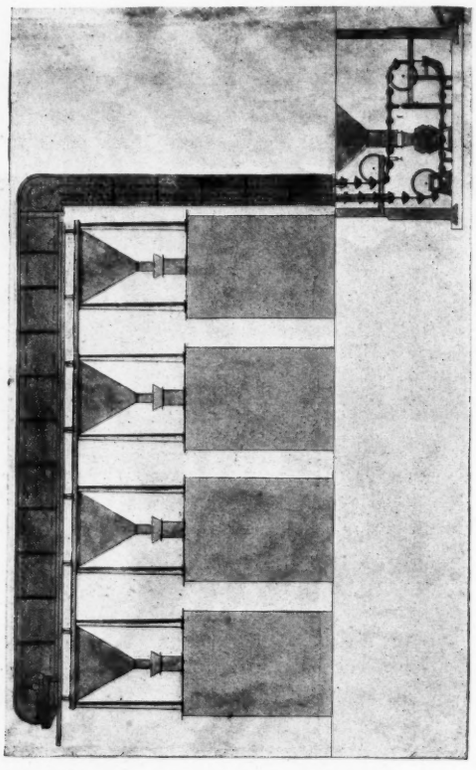


FIG. 21.

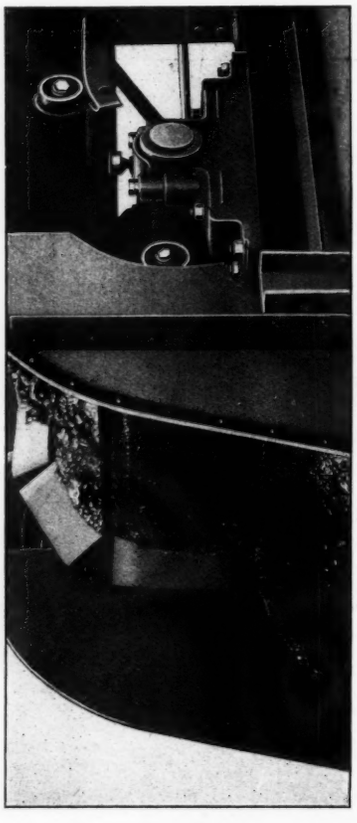


FIG. 18.

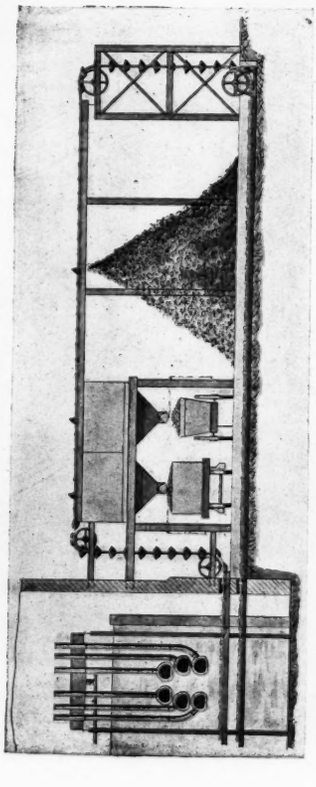


FIG. 19.

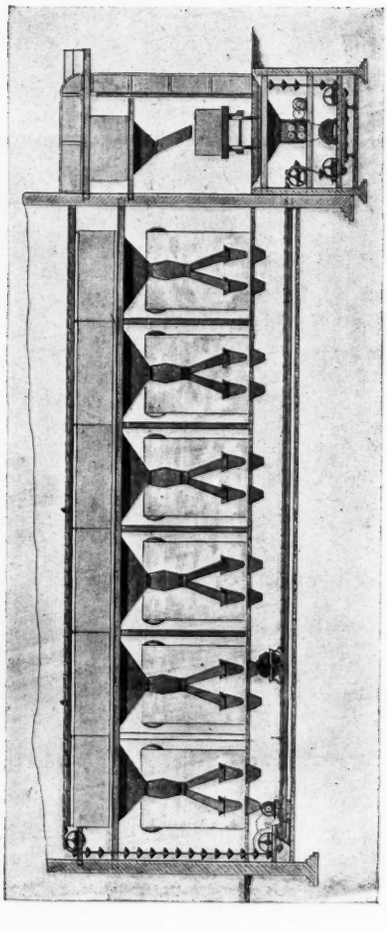


FIG. 20.

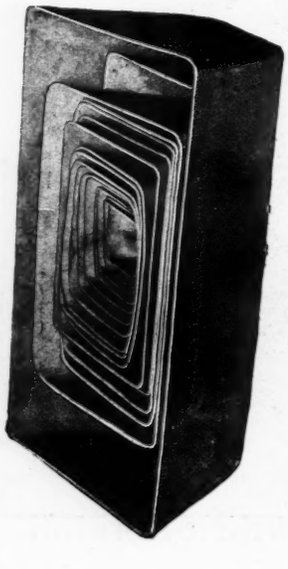


FIG. 17.

we find the first record of a moveable trough conveyor, made by William Murdoch, to carry small stampings from one machine to another at the Soho Foundry, Smethwick. It consisted of an endless chain, with trays or overlapping pans fixed thereto and revolving round end drums.

Until about the year 1886, when the author first of all turned his attention to a speciality business to supply conveyors and elevators, the demand for such appliances was small; and he had to discover works where they could be adopted with marked labour-saving results. The demand quickly grew; and during the last fifteen years, great progress has been made. The spiral conveyor, or "magnified cork-screw," was introduced by the author's firm about 1888; and it has been very largely adopted in works of all kinds. The best-known conveyors and elevators are the band-and-chain designs, and the tilt-bucket.

There are five designs of screw conveyors—the Archimedian screw (fig. 1), the flat-bar spiral (fig. 2), the V-shape spiral (fig. 3), the paddle-blade spiral (fig. 4), and the T-bar spiral (fig. 5). The Archimedian screw held the field for about two thousand years; and, as already mentioned, for light materials it is still extensively used. The paddle-blade screw was invented early last century, and came into prominence in 1882, when the roller system began to be generally adopted in flour-mills. One great advantage of the paddle-blade screw is that, by reversing the blades, the material can be carried to the right or the left hand. The T-flat and V-bar spirals

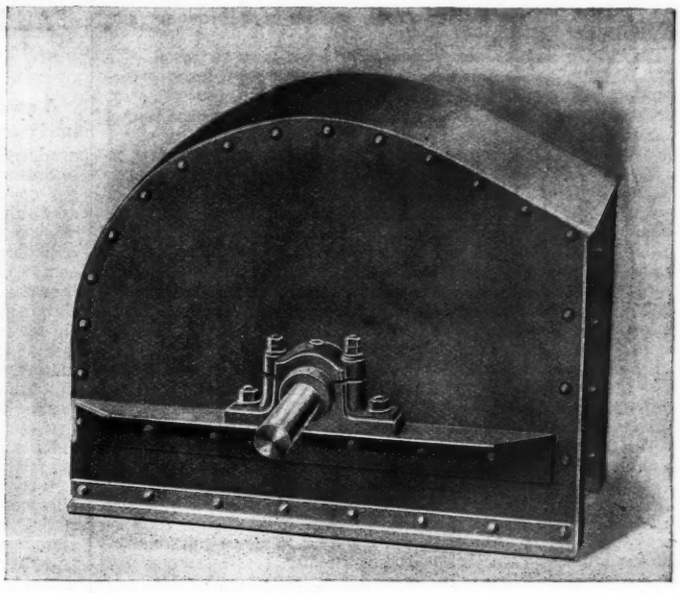


FIG. 23.

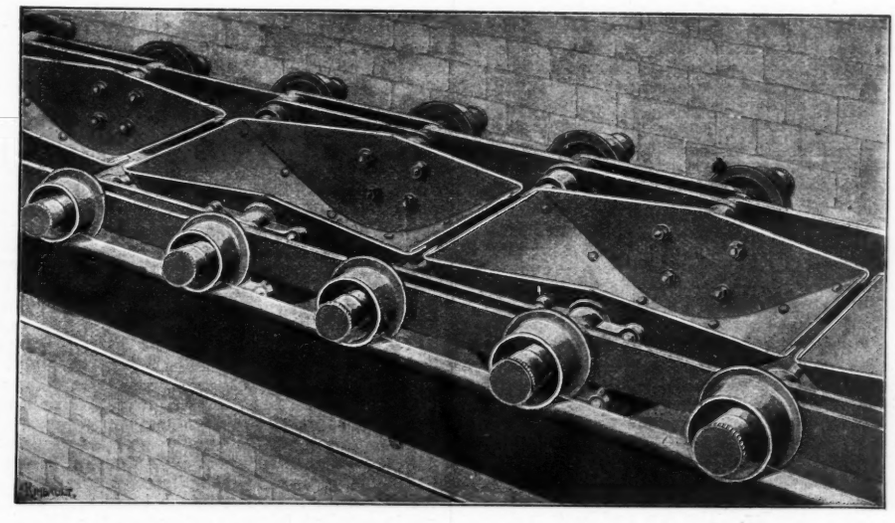


FIG. 24.

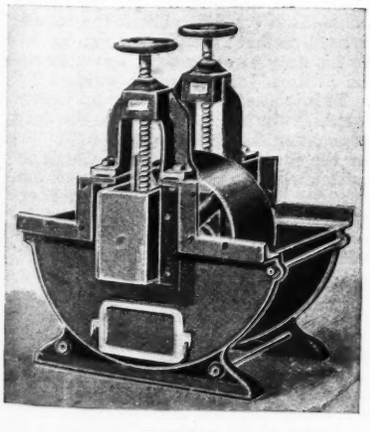


FIG. 25.

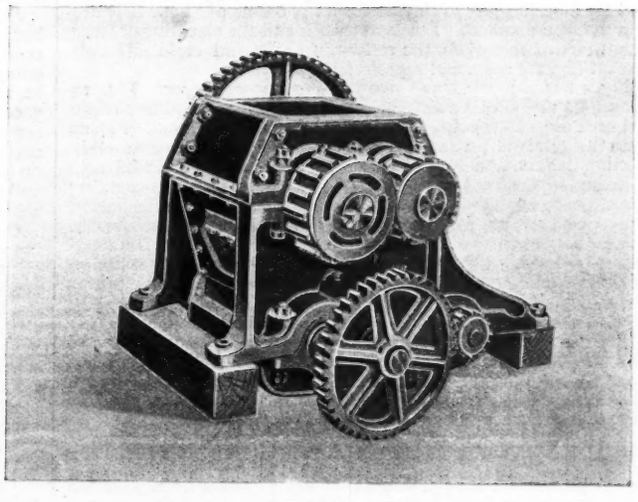


FIG. 26.

were all brought on the market about 1885-6. These were, however, preceded by the round-bar spiral in 1884. Fig. 6, a round-bar spiral, enjoyed a flash of favour for a few months; but it quickly became obsolete. When adopted in cement factories to convey ground cement, in gas-works to carry oxide, in chemical works to move phosphate flours, at collieries to transmit small coal, and in boiler-houses to remove the ashes, it was found that the friction on the materials between the periphery of the spiral and the casing of the trough was so great that the round bar soon wore down on the face to a half-round bar, and the

arms binding the spindle and spiral together wore through. The conveyor thus quickly fell to pieces.

The V-flat and T-bar spirals have been very successful for light, medium, and heavy materials respectively; but for long distances a band conveyor is preferable. Band conveyors (figs. 7, 8, 9, and 10) are made of textile materials, leather, joggled steel plates, or overlapping steel pans. Fig. 7 shows a band conveyor for belts up to 14 inches wide, and fig. 8 one for belts from 15 to 30 inches wide. This is the best design of band conveyor to carry large quantities. The two side pulleys, each with its axis at an angle of about 45°, make a neat trough-belt to carry large quantities. Fig. 9 is a band conveyor rising at the end to deliver the material on to a storage yard, over a waste heap, or into waggons or barges. Conveyors of this design can be made for almost any length. Fig. 10 shows a steel-pan conveyor to carry coke, clinkers, coal, ores, broken stone, or granite; and over 600 of this design have been erected during the last ten years. For long distances, where the materials have to be deposited over the end of the conveyor, the steel-pan is the best form. When the materials require to be deposited at several points in transit into hoppers or over a storage yard, the push-plate conveyor (fig. 11) is the most adaptable design. This form has been largely adopted to trim coal into the hoppers fixed over benches of inclined retorts in gas-works, over ranges of gas producers, mechanical stokers, coal pockets, and ore bunkers.

Figs. 12 and 13 illustrate an arrangement of elevator lifting coal to a push-plate conveyor, which then distributes it into an overhead range of hoppers 130 feet long. Fig. 14 shows a continuous coal hopper over a bench of inclined retorts, into which the coal is mechanically delivered over every retort at the exact point required; and by actuating the cut-offs of the "shot-pouch" measuring-chamber, the charge therein for the retort below glides through the shoot and spreads evenly over the bottom of the retort. This is a popular system, and has reduced the cost of charging retorts from 3s. and 4s. to 1s. 6d. and 1s. 3d. per ton of coal. It is in operation in gas-works in all parts of the world. The continuous overhead storage hopper, with the "shot-pouch" measuring-chambers, valves, and levers, forms, with the coal and hot-coke conveyors and elevators, an undoubtedly complete automatic system. The first "shot-pouch" was put in at the Southall works of the Brentford Gas Company. There are many thousands of them now in use. Similar "shot-pouch" measuring-chambers to hold the charge, or measure the quantity of coal, have also been adopted in boiler-houses for power stations and electric light stations, and also to feed coal into ranges of gas-producers. The types of conveyors used to handle the coal are spiral, moveable tray-troughs, push-plate, band, or tilt-buckets, according to local conditions and the quantity of coal to be delivered per hour to the overhead storage bunkers.

In nearly all installations, elevators are used to lift materials to the conveyors. The two chief types are band elevators with seamless stamped steel buckets, for seeds, flour, powders, and other light materials (fig. 15), and pitch chains with malleable cast buckets (fig. 16) for heavy materials. A chief feature of band elevators has been the numerous kinds of strapping and belting that have lately come into general use. Another feature is the great efficiency that has been attained in the manufacture of seamless stamped buckets (fig. 17). These can be stamped any size and any thickness up to $\frac{1}{4}$ inch. On a suitable band, they form an excellent elevator. The top and bottom drums should always be convex on the face. Greater variety has characterized the progress of chain-belt elevators. For many years there was a great run on detachable pitch chains for elevators; and for light designs to elevate from 1 to 6 tons per hour they are still in large demand. For heavy work and the elevating of large quantities of materials, the roller-pin chain and malleable cast bucket (fig. 16) are usually preferred.

Fig. 18 is a joggled and overlapping pan-conveyor. Fig. 19 is an illustration of a continuous coke carrier arranged to obviate the breaking of the coke, as only one "drop" is required. Fig. 20 is an illustration of a modern automatic boiler-house at an electric-lighting station in London; the upper run of tilt-buckets distributing the coal to the bunkers and the under run carrying the ashes to the ash-hopper. Fig. 21 shows an endless tilt-bucket conveyor, carrying coal to a battery of Mond-Duff gas-producers. Fig. 22 is a new type of boot for chain elevators. Fig. 23 is a dustless steel hood. Fig. 24 shows all the details of the latest design of tilt-bucket conveyor, and Fig. 25 is the boot of a hand elevator for oxide and lime. Fig. 26 is a new design of coal-breaker, with shrouded steel pinions and manganese steel claw crushers.

An encouraging feature in the development of conveyors and elevators is that, since the demand was created, the progress has been steadily increasing, and it is more abundantly evident that a prominent characteristic of present-day progress is the increasing adoption of labour-saving machinery to transmit materials.

A process for the purification of water gas has been patented in Germany by Herr Lazarus. The water gas is first passed through a heated retort filled with coke, whereby the carbon dioxide contained in it is converted into carbon monoxide, and is then freed from sulphur and cyanogen by passing it, in the hot condition, over oxides, hydroxides, carbonates, or silicates of alkali, alkaline earth, or earth metals, or the oxides or hydroxides of iron or zinc, heated, for example, to 500° C.

A PERFECT METHOD OF STOCK-KEEPING.

By J. P. Wiatt, of Reading.

A good, sound, and reliable method of keeping stock is absolutely essential in all commercial undertakings where materials are largely handled by workmen, &c., not only to prevent theft, but also to prevent miscarriage of goods, especially in the case of gas companies, where articles may be left on private premises and forgotten by the fitter or workmen, and, unless there is some way of checking, may be lost to the company. Of course, it must be understood that the store-keeper should be responsible for all shortage in stock—he being the only employee (with his assistant, if one is necessary) who should hand out goods—providing that the stock-books kept in the office are proved correct. The method shown below is, I think, without doubt the best and most accurate system of keeping stock; and though there are but few gas companies who adopt it, others will do well to consider the advisability of keeping an exact and detailed account of all materials used. The essentials necessary for accurate store-keeping are, first of all, well-arranged stores, and, secondly, a competent and efficient store-keeper. Given these two conditions, the system set forth will be found easy to work and perfect in results.

We will in the first place take all materials that are used on district work—such as tube, lead pipe, tube fittings, main cocks, lamp cocks, and brass and barrel unions—they being supplied by the store-keeper for service laying, fixing meters, cookers, gas-fires, &c. The fitter or service layer, on being given instructions to (say) fix a meter or cooker, after having visited the premises to ascertain what materials are required—or having obtained the information from the inspector, if it is his duty to inspect premises where work is to be executed—will call at the stores for the materials necessary to complete the work; the store-keeper supplying him with same, together with a paper as per Form A. It will be seen that on Form A there are three divisions—one for "Goods supplied," one for "Goods returned," and one for "Goods used." The store-keeper, on issuing the sheet, enters the materials given out in the column for "Goods supplied."

Let me, before I go any further, explain the book (which need only be quarter binding) from which Form A is issued, and in which there should be about 400 forms or more; 200 being fixed in in the ordinary way, and 200 perforated, to enable the store-keeper to detach them when filled in and hand them over to the workman. It will be seen then that, with the aid of a carbon sheet, a duplicate can be obtained. This will, of course, prevent the fitter from altering the quantity of goods he receives, and prevent mistakes in the event of the figures becoming blurred through handling; or, as sometimes may happen, the ticket may be lost, when the duplicate could be referred to for information. The sheets should be numbered thus: No. 1 perforated (to be torn out) and No. 1 fixed, No. 2 perforated and No. 2 fixed, and so on. When the work is completed, the fitter will enter on the form he has received the amount of materials used, and should return what he has over to the store-keeper—the store-keeper seeing that the quantity used, *plus* the quantity returned, agrees with the quantity supplied. He should also enter the goods returned (if any) on the sheet, in order to show a balance. Then the duplicate form left in the book must be filled in, and the goods supplied (already entered on the fitters' sheet) should be checked with the sheet remaining in the book, to see if the figures have been in any way tampered with, either intentionally or unintentionally.

At this stage, the store-keeper's responsibility with regard to booking is at an end; he merely sending the sheet showing goods supplied and goods used and returned (if any) to the office for entry into the several journals and stock-books, &c. The clerk, on receiving the sheets, should be careful to check the total of goods returned and goods used, so that it will balance with goods supplied. It will then be his duty to enter work executed and materials supplied into the Fittings Journal, which will be ruled up as shown on Form B. This journal should be cast up weekly, and the total should be entered into the Stock-Book on the debit side; the Stock-Book being arranged as per Form C.

On the creditor side of the Stock-Book all goods which are bought, or any old piping, &c., which may be brought back and cleaned up and returned to stock, should be entered; the books should be balanced up quarterly or half yearly; and the total—*i.e.*, the difference between the debtor and creditor—in the books should, of course, agree with the goods in the stores (or at least very nearly). Stock should be taken accurately at the commencement of such a system as this, and also on all following stock takings. It goes without saying that the goods in stock when this system is started are entered on the credit side. Then in each succeeding half year it is only necessary to enter the goods that are *actually in stock*, not carry forward the figures in the book. There is, of course, no reason why, with a little care, one should not strike an exact balance, except perhaps with the exception of tube and lead pipe. Mantles (of which various sizes should be kept separate), mantle protectors, chimney globes, incandescent burners, &c., can be all treated in the same way as shown.

It will be noticed that on Forms B and C, though the different size of tubes have been entered separately, with tube fittings, no attempt has been made to keep detail of sizes, as it entails an endless amount of work, which is quite unnecessary. Yet it must

FORM A.

No._____ Date_____ 190

Name——Wiatt. *Address*——87, Broad Street.

Nature of Work——Fix meter and lay service.

METERS, FIRES, STOVES, &c.	Materials Supplied.						Materials Returned.				Net Materials Used.				Waste.	
	Given Out. 1 5-lt Cowan, 30,576, zero.						Returned. —				Used. 1 5-lt. Cowan, 30,576, zero.					
Description.	Quantity.	Size.	Quantity.	Size.	Quantity.	Size.	Quantity.	Size.	Quantity.	Size.	Quantity.	Size.	Quantity.	Size.	Quantity.	Size.
Tube—feet	30	1″	10	¾			5	1″	10	¾	25	1″				
Lead pipe	3	1″									3	1″				
Bends	2	1″	1	¾					1	¾	1	1″				
Elbows																
Tees	1	1×½					1	1×½								
Unions																
Connectors	3	1″	2	¾					2	¾	3	1″				
Reducing sockets																
Nipples																
Plugs																
Caps	2	1″					1	1″			1	1″				
Main cocks	1	1″									1	1″				
Brass taps																
Brass sockets																
Brass elbows																

FORM B.—*Fittings Journal.*

Date.	Name.	Address.	Materials Used.																														Ticket No. (Store-keepers).	Folio.	Remarks.
			Tube.						Lead Pipe.		Bends.		Elbows.		Tees.		Unions.		Reduc. Tees.		C. & B. Nuts.		Sockets.		Nipples.		Plugs.		Caps.		Red Sockets.		Red Elbows.		Main Cocks.			
			2″	1½″	1¼″	1″	¾″	½″	Ft.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size			

No._____

FORM C.—*Goods Given Out.*

Date.	No. of Order.	Cylinder Oil.	Boiled Oil.	Lubricating Oil.	Turps.	Sperm Oil.	Paraffin Oil.	Pine Oil.	Black Oil.	Colza Oil.	White Lead.	Red Lead.	Soda.	Meth. Spirits.			Brushes.	Brooms.	Buckets.	Pick Handles.	Shovels.	Shovel Handles.	Forks.	Waste.	Tarred Yarn.	Stokers' Gloves.	Baskets.	Swabs.	Block Tin.	Oil Cans.	Files.	Asbestos Packing.	Chamo's Leather.			
		Pts.	Pts.	Pts.	Pts.	Pts.	Pts.	Pts.	Pts.	Pts.	Lbs.	Lbs.	Lbs.	Pts.			No.	No.	No.	No.	No.	No.	No.	Lbs.	Lbs.	No.	No.	No.	Lbs.	No.	No.	Lbs.	No.			
	Total																																		

be borne in mind that, at stock-taking, account should be taken of each size, so as to enable one to price out the stock with absolute accuracy, instead of taking, as so many gas companies do, a rough estimate (or guess) of the value of their stock.

Goods which are consumed on the works—such as the various oils (lubricating, cylinder, black pine, &c.), waste, yarn, brooms, brushes, chamois leather, swabs, picks, shovels, forks, stokers' gloves, &c.—will have to be treated in a slightly different way. With all these goods the store-keeper should have strict instructions to supply no one who has not a written order from some one in authority—either engineer, foreman, or chief clerk in the office, according to arrangements made and convenience. These various orders the store-keeper should enter on a sheet exactly similar to the debtor side of Form C, which should be sent up to the office weekly, together with the orders he has received, for the clerk to check; and the clerk should enter the total of each week into his Stock-Book, which has its various headings suitably arranged. With liquid goods, like oils and boiler composition, a small allowance will have to be made either way at stock-taking, as it is unreasonable to expect it to be quite accurate.

I do not pretend that the foregoing is a full account of keeping

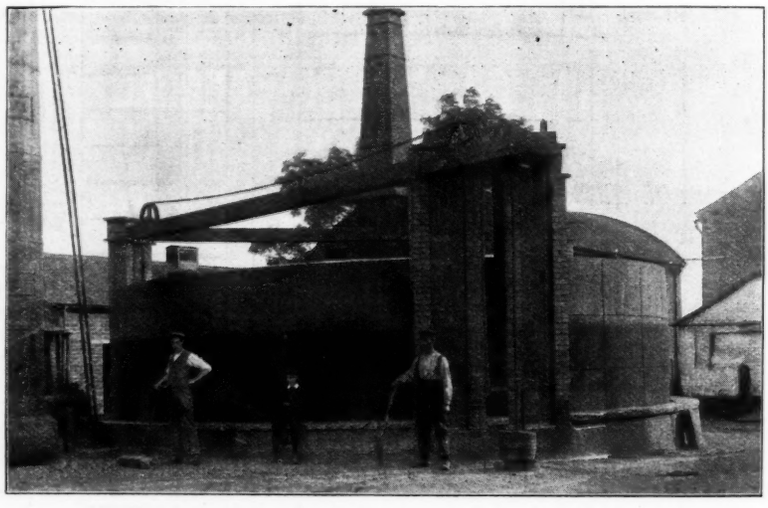
stock of all goods; my intention has only been to show a method which is applicable to all materials. No doubt, slight alterations in this system would have to be made to meet the demands of various companies—viz., their existing books, and the condition of their stores; but with a little organization such slight obstacles could be overcome.

Before concluding, I should like to say that accurate stock keeping should not be pushed too far; for when it is suggested that a detailed account should be kept of screws, nails, bolts, nuts, and other trifling details, one can at once realize the immense amount of work that would have to be undertaken, and which would be found to be quite unprofitable owing to the comparatively small cost of the goods mentioned. But it is as well to insist on workmen obtaining an order for everything they may require—no matter how trifling it may be.

SOME FEATURES OF THE BUNGAY GAS-WORKS.

An Interesting Old Gasholder.

In the "JOURNAL" for June 4, 1901, we were able, through the courtesy of Mr. Leonard Hall, of Rhyl, to give an illustration of an old central-column gasholder, which was one of the two originally erected at the Boston (Lincs.) Gas-Works; and it may be remembered that reference was made to it in the account given of the gas supply of the town by Mr. J. S. Dougall, the Gas Company's Engineer, on the occasion of the meeting of the Eastern Counties Association of Gas Managers in the following spring. This interesting "relic of the past" has a companion at the Bungay Gas-Works; and we are pleased to reproduce below a photograph of it which has been placed at our disposal by Mr. W. Methven, the Engineer and Secretary, who is also the Manager of the Beccles Water and Gas Company. The Boston holder is 35 feet in diameter and 13 ft. 6 in. deep; and it was put up by Mr. Joshua Horton for Mr. Thomas Piggott, of Birmingham, in 1826. The Bungay holder was erected eleven years later—in 1837—by Mr. John Malam, who built a number of works in the Eastern Counties. It was originally designed to hold about 7000 cubic feet; but the tank appears to have been leaky, and was only made serviceable by putting in something like 3 feet of puddle—reducing the capacity of the holder to this extent. The water-line on the sheeting shows this plainly. The holder is nevertheless still in fair condition.



Though the gas-works are old, they do very fair work. The sale of gas is 5½ million cubic feet per annum, the make per ton 10,400 cubic feet, the leakage a little more than 5 per cent., and the sale of coke 6·8 cwt. per ton of coal carbonized. The retort-settings, upon the generator system, are most successful, as shown by the sale of coke and make of gas per ton. Last year an exhauster was added to the plant; the motive power being furnished by means of a 2-horse Crossley gas-engine. When everything is running, the engine works at about three-quarter power. The make of gas per ton previous to the installation of the exhauster was 10,160 cubic feet; and after six months' work the average for the year was 10,400 cubic feet. The engine also operates the liquor-pump and the water-pump; the latter throwing about 1500 gallons of water per hour, and raising it 40 feet. The pump delivers into a 1000-gallon tank, and supplies the local water-cart, under contract, to the extent of 7000 gallons per day. The pump, engine, and exhauster were fixed by the Company's own men. Since the pump was erected, the Company have had a contract, consisting of a tank, engine-pump, &c., for supplying a gentleman's private house and grounds with water. In this case the motive power is a 1-horse Gardiner engine, and it raises the water upwards of 50 feet; 500 gallons being lifted in three-quarters of an hour at the cost of about 1½d. This could easily be reduced by running the pump faster; there being, it is estimated, at least 20 per cent. of power to spare.

As there are still a number of small towns which have no water supply, and the water required for the streets is pumped by hand, the foregoing particulars as to what has been done at Bungay may be not only interesting but a source of profit to some other company. The cost of the necessary plant was £50; and the contract entered into was for a period of five years, at £22 per annum. When the water was pumped by hand, less than 3000 gallons per day were put upon the roads by two men; whereas now, as already stated, 7000 gallons have been spread by the same water-cart, horse, and one man. The works were purchased in 1867 by Mr. T. H. Methven, and they have been carried on by his executors since his decease.

It only remains to add that the work referred to was carried out under the direction of Mr. W. Methven.

AMMONIA RECOVERY IN CONTINENTAL GAS-WORKS.

The following particulars of the recovery of ammonia from coal gas, as practised in Austrian, German, and Swiss gas-works, are taken from an exhaustive paper which was presented by Herr A. Teodorowicz, the Manager of the Lemberg Gas-Works, to the general meeting of the Association of Gas and Water Engineers of Austria-Hungary, which was held in Vienna in June. The paper has since been published in full in "Der Gastechniker."

In Austria, there are still gas-works with a make of over 35 million cubic feet per annum which do not recover any ammonia from their gas. The loss incurred by this neglect is very great, as a study of the figures for the amount of ammonia in crude coal gas will show. From 6 to 20·7 per cent., or on an average 14 per cent., of the nitrogen in coal is converted into ammonia in gas-works. The ammonia which should be obtained, stated in percentages of the weight of coal carbonized, has been given for coal from different sources by the authorities named as follows:—

Description.	Knoblauch (1883) or Schilling (1887).	Drehschmidt (*) 1904.
English coal	0·189	0·176 to 0·364
Westphalian coal	0·248	0·204 ,, 0·290
Silesian ,,	0·284	0·146 ,, 0·317
Saar ,,	0·188	..
Bohemian ,,	0·129 to 0·237	..
Saxony ,,	0·094	..
Platten ,,	0·221	..

* See "JOURNAL," Vol. LXXXVII., p. 460.

These figures agree fairly well with the yields of ammonia products obtained at well-managed gas-works, as the following figures show:—

Cologne gas-works	0·23 per cent. of ammonia.
Dantzic	0·25 ,, ,, ,,
Düsseldorf	0·24 ,, ,, ,,
Nuremberg	0·139 ,, ,, ,,
Zürich	0·19 ,, ,, ,,
Bâle	0·163 ,, ,, ,,
Magdeburg	0·18 ,, ,, ,,

The first four of these works make sulphate of ammonia; and the yield of ammonia has been calculated on the assumption that the sulphate is free from impurities, which is not the case. The yield of ammonia must be about 0·02 per cent. less in these cases. Zürich works up its liquor into "concentrated liquor;" and Bâle and Magdeburg make liquor ammoniæ instead of sulphate. It would therefore appear that the ammonia recovered should amount to at least 0·16 per cent. of the weight of coal carbonized, and average about 0·20 per cent. Yet very many works scarcely recover 0·10 per cent.

In order to recover as completely as possible the ammonia produced by the carbonization of coal, it is necessary, in the first instance, that the gas-works should be equipped with some good condensing and washing plant, which will effect almost complete absorption of the ammonia with as small a consumption of water as may be. Then the working of this plant must be properly controlled. The author recommends the following mode of testing (here adapted from the metric to English weights and measures) as a means of controlling the working of the washers. A small stream of the gas is drawn through a known volume of

decinormal sulphuric acid, and measured by means of an aspirator of nearly 1 cubic foot capacity. The volume is measured in fluid ounces ($\frac{1}{1000}$ cubic foot); and the number of cubic centimetres of decinormal acid neutralized by the ammonia in the gas is determined by titration, using methyl orange as an indicator. Then if n c.c. of acid has been neutralized, and k ounces of gas drawn through, the amount of ammonia (x) in grains per 100 cubic feet of gas is:—

$$x = \frac{n \times 0{\cdot}0017 \times 15{\cdot}432 \times 100{,}000}{k} = \frac{2623\,n}{k}$$

The quantity of ammonia in coal gas, after proper washing, should not exceed 0·22 grain per 100 cubic feet.

It would be better to state the yield of ammonia from the coal as a percentage of the weight of coal carbonized (as is already done in all Swiss gas-works) and not as so many kilograms (or gallons) of ammoniacal liquor, which by itself has no definite meaning. The liquor, on the Continent, is worked up into any one of three products—viz., (1) sulphate, containing theoretically 25·78 per cent. of ammonia; (2) concentrated gas liquor, containing 15 to 25 per cent. of ammonia; or (3) ammonia or liquor ammoniæ, of ·916 to ·910 specific gravity. The crude liquor of the gas-works contains only 1 to 2 per cent. of ammonia, of which about one-fifth is "fixed," or requires the use of lime for its liberation.

Apart from loss of ammonia through inefficient washing of the gas, ammonia may also be lost in the working up of the liquor. The stills for driving off the ammonia from liquor are now always made for continuous work. The author describes, as typical of the modern type, a "Bamag" continuous still, for the treatment of 2200 gallons of liquor per diem, which was last year introduced at the Lemberg Gas-Works. This apparatus works so thoroughly that barely 6 parts of ammonia are left in 100,000 parts of the spent liquor. The carbonic acid evolved along with the ammonia is retained in a milk-of-lime washer, and the ammonia is then condensed to form concentrated liquor containing upwards of 25 per cent. of ammonia. For making liquor ammoniæ it is necessary to have three such washers, two condensers, two carbon filters, an oil washer, and two absorption vessels. This additional plant costs rather more than as much again as the plant which suffices for making concentrated liquor.

Aërator for a Water Reservoir.

An aërator and fountain, arranged in an interesting manner in the water-works system of Newark (N.J.), has just been put in operation. The water supply for the city is brought by pipe-lines for some distance from large storage reservoirs, and delivered to three small ones from which the distribution system is directly supplied. One of these reservoirs is in a park which has recently been opened by the city, and to add to its appearance a fountain was built in the centre of the reservoir. It consists of 33 vertical wrought-iron pipes, with flat jets at their discharge ends, which produce a fan effect on the issuing water. The pipes are spaced in three concentric circles at the middle of the reservoir, nine in a cluster at the centre, eight on a radius of 12 ft. 6 in., and the remaining sixteen on a radius of 25 feet. The discharge of the pipes in the central cluster is about 3 ft. 6 in. above high-water level in the reservoir; while the discharge of those in the outer circle is at just about high-water level, with those in the middle circle at an intermediate height. The fountain is supplied by a 10-inch main laid along the bottom of the basin. Water is delivered at the base of the pipes under a pressure of from 40 to 55 lbs., and about 4 million gallons of water pass through the pipes in a day. The central streams reach nearly 40 feet above the high-water level in the reservoir when water is supplied under the maximum pressure, and the discharge from the jets forms a cone-shaped fountain nearly 100 feet in diameter at the base.

It may be remembered that one of the speakers in the discussion on Mr. Yuill's paper at the meeting of the North British Association of Gas Managers, as reported last week, was Mr. A. Munro, of Falkirk. We learn that Mr. Munro (who is with Messrs. R. & A. Main, Limited) has lately gained a silver medal and a prize in connection with the examination in "Advanced Bookkeeping" by the Society of Arts. He was second in a list of 1860 candidates who underwent the examination; and this is the second time he has been a medallist.

An apparatus for the detection and determination of carbon monoxide has been patented by MM. Lévy and Pecoul. The process depends upon the liberation of iodine from iodic acid by carbon monoxide, and the absorption of the iodine in a solvent with which it forms a coloured solution. The gas containing the carbon monoxide is led first through a filter of glass wool, and then through a heated U-tube containing pure iodic anhydride. The iodine set free is carried forward by the gas, and is led through an absorption-tube containing some chloroform, carbon bisulphide, or other suitable liquid, covered with a column of distilled water, about 8 centimetres high, to prevent evaporation. The chloroform or carbon bisulphide acquires a depth of tint proportional to the quantity of iodine set free by the carbon monoxide; and the amount of the latter can be readily determined by comparing the colour with that of a standard solution.

GAS FOR THE HOUSE:

Suggestions for Inspecting and Supervising Consumers' Fittings and Burners, and Establishing Central Stores and Show-Rooms.

By W. B. M'Lusky, of Perth.

[A Paper read before the North British Association of Gas Managers.]

This subject has, in one or two important particulars, engaged the attention of the North British Association of Gas Managers in former years. The following report was submitted at the annual meeting in 1887: The remit on the best standard burner for Scotch gas has been under the consideration of the Committee; and it was resolved to place the results of the testings of burners by the five previous operators in the hands of Mr. George R. Hislop, the Convener of the Sub-Committee on the question.

At the same meeting, Mr. Hislop read a paper on "Standard Burners and the Propriety of Supplying Consumers Gratuitously with the Burners Best Adapted for the Gas Supplied." The following year (1888) Mr. Hislop made a further valuable contribution to the subject, in his paper dealing with the relative results obtained with different qualities of gas burned at a constant pressure through No. 7 union-jet burners drilled at various angles; and Mr. James M'Gilchrist read a paper entitled, "Selling Gas," in which he described (1) "The ideal gas undertaking which would look to the piping and lighting arrangements within the houses of their consumers," (2) "would abolish rents for meters," (3) "would introduce a system of payment approximating to the ready-money system," (4) "would canvass vigorously for business on the system which is common in ordinary commercial pursuits."

Flat-flame lighting was almost universal in those days—the Welsbach incandescent mantle being in the experimental stage; and a very small proportion of the output was used for cooking, heating, or power purposes. At the present time it is estimated that fully 60 per cent. of the gas used for lighting is consumed with incandescent burners; and wherever proper facilities have been offered, and the business systematically pushed, 50 per cent. of our consumers use gas for cooking and heating. It will be freely acknowledged, therefore, that if skilled supervision and control of consumers' fittings and burners were necessary twenty years ago, when practically only one type of burner was used, the demand to-day is most urgent, when there is a large variety of burners and appliances for lighting, cooking, and heating purposes. In flat-flame lighting the "preventible loss" due to the use of unsuitable burners amounted to 25 per cent. of the gas registered at the consumers' meters. With incandescent lighting the proportionate loss per burner has not been materially reduced, because the success of this system depends upon skill, not only in fixing, but in maintaining the burners and mantles, &c., in proper working order; and in the carrying out of this important work our consumers have hitherto been left to their own resources. We cannot expect consumers to grapple with such problems as the proportion of air to gas in the bunsen tube, length and diameter of mantle, chimney, &c., in relation to the hourly rate of consumption and quality of gas supplied; and it is outside the province of landlords, architects, builders, or even gas-fitters to relieve the gas supplier of his responsibilities in these essentials to successful gas lighting. It is clearly our duty to step in and assist the consumer from whom we collect gas-rental "as per meter index," whether the quantity registered has been economically consumed or partially destroyed.

The average duty of flat-flame burners in Scotland may now be taken at $3\frac{3}{4}$ candles per cubic foot of gas consumed, and that of incandescent burners of various types at 25 candles. The incandescent burner, therefore, produces six-and-a-half times more light per unit of gas than the flat-flame burner. The 60 per cent. of incandescent burners in use are providing ten times more light than the remnant 40 per cent. of flat-flames; and the total distribution of gaslight to-day, exclusive of new business, is four-and-a-half times greater than it was before the introduction of the incandescent system. These are the results which are actually obtained wherever the lighting is controlled by municipalities, gas companies, millowners, engineers, or business men; and the revival of gas lighting and the return of many consumers who for a time preferred electricity, is largely due to the successful installations of modern gas lighting carried out under such auspices.

"Gas for the house" has not, however, been fostered to the same extent. Engineering skill and expert advice have not yet reached the homes of the people. We have found the working up of secondary products at the gas-works worthy of all the skill at our command. Why should we deny consumers the benefits of skilled advice in the utilization of the prime product?

It may be urged that work of this description comes properly within the scope of the gas-fitting trade; but I submit that it is the business of the gas-fitter or trader to sell, and the duty of the gas supplier to see that his consumer is provided with, fittings and burners capable of producing the highest possible duty from the gas consumed. The gas supplier is bound by Act of Parliament to supply a standard quality of gas; and he is morally bound to ascertain whether the consumer is obtaining standard results. Standard results cannot be expected, however, so long as we are without a standard regulating the supply, fixing, and maintaining of fittings and burners. Every branch of engineering

or constructional work is conducted in accordance with a recognized system, specification, or classification; but gas-fitting is still carried on without survey or disinterested control of any kind. Almost a quarter-of-a-century ago, this Association adopted Mr. Newbigging's standard specification for the guidance of builders, architects, and gas-fitters, in the laying of gas-pipes; but for want of a proper working arrangement between the trade and the supplier of gas, little practical benefit has resulted, and, notwithstanding improvements in burners and the development in the incandescent system, cases of defective lighting, waste of gas, and dissatisfied consumers are by no means uncommon.

The evidence of all those years of failure to solve the problem proves that there are difficulties in the way; but from careful study of the question I am convinced that all these difficulties may be removed by the unification of the interests of the gas supplier, the gas-fitter, and the gas consumer. As suppliers of gas we have only one end in view—to provide the consumer with an efficient and economical light at every burner in his premises. To accomplish this end, I have drafted the following scheme as the basis of co-operation and combination between the trade and the gas corporation or gas company in every town, and now submit it to the earnest consideration of this Association:—

1. That the gas corporation or company should establish a central wholesale store for the sale only to the trade of fittings, burners, mantles, &c., at net prices.
2. That one or more show-rooms, according to requirements, should be opened by the gas corporation or company, where such fittings and burners would be exhibited, and their use demonstrated to the public; every article being marked at prices mutually agreed to by the trade and the gas corporation or company.
3. That a list of gas-fitters, approved and accepted by the gas committee or board of directors, be exposed in a prominent place in the show-room.
4. That consumers' orders be received at the show-rooms, and immediately transmitted to the gas-fitter named by the consumer.
5. That in the event of the gas-fitter desiring the gas corporation or company to execute the order for him, this should be done, and the gas-fitter charged with the cost per burner or fitting fixed, on a scale of charges agreed upon, in addition to the net cost of the fittings or burners.
6. That orders for gas fittings and burners should be received at the shop or workshop of every approved trader, and transmitted to the stores or show-rooms of the gas corporation or company for supply only, or for supply and fixing outright, as the case may be.
7. That the gas corporation or company should officially inspect all work done by their own or other fitters.
8. That the gas corporation or company should maintain in an efficient state of repair all burners and mantles in consumers' premises on a scale of charges covering net outlays.

In discussing these proposals, it must be borne in mind that gas-fitting in Scotland is a subordinate branch of the plumbers' or tinsmiths' trades, and that sanitary engineering and electric lighting, which are the main features of the progressive plumbers' business, are more attractive pursuits than the fixing of incandescent burners which cost 9d. each and are sold at 1s. The busy tradesman has not the time at his disposal to follow the development of gas lighting. It is part of the gas engineer's work to do so. If the gas-fitter is to keep abreast of the times, he must constantly replenish his stock, and realize upon that which is obsolete. On the one hand this does not profit the trader, and on the other it induces gas consumers to purchase antiquated and unsuitable fittings.

One central store in, and one stock for the trade of, each town will serve consumers' wants in lighting as well as it has already done in regard to cooking and heating stoves, and consumers, traders, and the gas corporations and companies will participate in the economic advantages attending the delivery of goods in large lots in the original packing cases, reduced cost for carriage, less risk of breakage, and the general convenience of a large and varied selection of modern fittings and burners on view and available at a moment's notice.

A decrease in consumers' lighting accounts may be expected, and this will popularize the use of gas for lighting and other purposes. A substantial increase in business will eventually result, and the continued and increasing prosperity of our gas undertakings will be assured.

Discussion.

Mr. D. Robertson (Dunoon) said every gas manager had experienced, many a time, that the product that he was sending out was being spoiled, in a manner, in its consumption; and what annoyed him still more was the fact that he had no control over the gas after it was delivered to the consumer. The misguided consumer, however, frequently spoiled the combustion of the gas. Very often, on account of defective fittings and inferior burners and mantles, he robbed himself of 50 per cent. of the lighting power of the gas he was purchasing. He had frequently been sent for to inspect gas-fittings and attend to complaints, which he found were due entirely to inferior burners or fittings; and it was singular how pleased the consumers were once they pointed out to them that they had been using a bad incandescent burner. In touching upon this point, he would just like to say that their district had been very much flooded with cheap incandescent burners. The air supply and the gas supply were not regulated; and the result was that the gas was burning up in a red flame through the mantle, and there was practically little light given off by the mantle at all. The consumer did not understand this; and if he were inclined to blame the gas corporation, or the gas company, or the gas manager, he thought it was the mantle which was wrong, whereas it was not the mantle at all—it was the gas which was not being properly consumed in it. Once this was explained to the consumer, and he was advised to have a proper incandescent burner fixed, a great deal of the trouble was removed. Sometimes they supplied an incandescent burner, just to prove that it was the burner which was wrong, because he thought it was cheaper to go this length. If, by putting on a new burner, they could demonstrate to the satisfaction of the consumer that it was really the burner which was bad, then he was satisfied, and arrived at the conclusion that the gas manager knew something about gas lighting, and he took the advice; and the next time he had occasion to consult him with regard to the question of inside fittings, he did so. It was sometimes heartless to see the style in which gas-fitting was done. He knew there were some gasfitters—a great many, he should say—who tried to make a good job; but the system of contracting for gas-fitting, and the way in which schedules were written out by architects, as a general rule left such a loop-hole to gasfitters who wished to cut the job of putting in anything. He had seen specifications for gas-fitting under which he could undertake that anything could be put in—any size of pipe, and almost any quality of it. One gasfitter cut down the price, and the other cut it down, till the man who obtained the work had really, in self-defence, to put in something of so inferior a quality as would make the job pay him. This was not as it should be. The architect should specify the gas-fittings in such a way that every gasfitter would be bound to tender for a job which would really serve the purpose for which it was intended. He often found gasfitters putting in compo. pipes, for instance. They just rolled them on to the joists without stretching them; and they could easily understand what took place. Once the people occupied the house and the temperature rose, the lead began to soften, and the pipes became perfect loops between the joists. They could not put in a wet meter in such a case, because in six months they would certainly have to take it out, or lose a consumer. The result was that they could not put in a wet meter, if a wet meter was taken out. It was just as good as lost stock to them; they could not put it in again. Another result was that when they put in a cooking-range the temperature was raised in the kitchen, where the meter was often situated, and the meter became to an extent a small steam-boiler, because, by raising the temperature of the water in the meter, a certain amount of watery vapour was given off; and this was carried away with the gas-pipe to the regions where the temperature was not so high. It got condensed in the pipes, and trickled down in the loops he had referred to; and then the trouble began with the consumer. These were little things which, if the undertakers had control of the fittings in houses, and control of the gasfitters, would not happen. He thought Mr. M'Lusky's idea of having the gasfitters coming to the gas office for their fittings would place them on an equal footing. Gas managers, who had the subject really at heart, would be able to choose the very best fittings in the market; and so the gasfitters would have no personal gain in putting in cheap and inferior goods. There would be an advantage in having one central store. The question arose as to when the gas manager's duties were to stop extending. There was no doubt but that, if they added all these extra duties to the gas manager's present duties, he would soon have very little time left for the gas-works at all. Personally, he might say that his duties—he was not complaining—had increased to a great extent through this cause. Before gas-stoves were introduced, the gas manager had not the same details to attend to; but he expected that the central store would lead to somebody being appointed to take charge of the fittings department. In large works they were all right; but in small or medium-sized works they could not afford this until the business increased to the extent Mr. M'Lusky referred to. In small works, the manager had all the complaints coming through his hands. He could see a great many advantages in Mr. M'Lusky's proposal, and he failed to see any disadvantages. He should welcome almost every suggestion he made in his paper. He could not see where they would be the losers; and he could see a great many ways in which they would be the gainers.

Mr. A. Yuill (Dundee) said there was one point which struck him in regard to the subject, and it was that, however anxious they might be to have all the fittings inspected and superintended, the question they required to face was, What were their rights? Could they demand entrance, and go into any newly-erected premises and say that the fittings were wrong, and that they would not give a supply of gas till they were put right? Unfortunately, they had nothing to do with this. But he thought that gas companies and corporations should agitate for legislative powers, so as to have the gas-fittings in properties or buildings, or wherever gas was supplied, subject to some regulations, such as water companies now enjoyed. That was the line they had to go upon. In his own case, he could advise gasfitters; but he considered they ought to insist upon their right to inspect the fittings, and to have them properly tested, not only for the benefit of the gas consumer, but

as a measure of public safety—the safety of the community at large—and more especially, when water gas was being largely introduced, they ought to take all measures to ensure that every precaution was taken for the benefit of the general public. He might mention that he had had the matter talked over; and the result was that the first time they required to go to Parliament possibly powers might be asked by the Town Council for this in particular, so that all fittings in consumers' premises might be properly inspected and examined before occupancy. Everyone who wished to be successful in the gas business ought to manage it the same as any other commercial business.

Mr. D. Macfie (Edinburgh) certainly thought that Mr. M'Lusky's contribution was a timely and valuable one, and that it was more difficult to differ from him than to agree with him—in fact, the paper was convincing right through. The President had made a remark, in his opening address, to the effect that, once upon a time the supply of artificial light was a monopoly in the hands of gas companies, and that, because of their independence, they showed an inclination to do little to encourage consumers in the use of gas. Now, if they went back to the very earliest times, they knew that gas companies were exceedingly careful as to how consumers used their product. Before the invention of meters, payment was by time-burning; and the gas officials were exceedingly careful to see that consumers burned their gas under suitable conditions, and did not burn it longer than the time agreed upon. He was afraid that the introduction of gas-meters led managers to take less interest in the realization of the gas which they supplied, because then the consumer had to pay for all the gas that he had, whether he utilized it or whether he wasted it. It was not the gas manager's business at that time to look into this; so he did not seek to educate the consumer in the proper use of gas. But there was not much need for them to do so then, because the pressure was low. He supposed the night pressure would not exceed 10-10ths before 1850. Ten years before that, when gas-governors were introduced, it was shown that the gas-governor would economize upon 10-10ths pressure as much as 25 per cent. They had travelled a long way in the matter of pressure since that date; but for many years it was not thought necessary to do very much in the way of regulating the control of gas at the consumers' point of issue. As years passed, pressure, as they knew, had to be increased for one reason or another. By and bye the use of gas cooking-stoves made it inevitable that gas should be sent out at a pressure much in excess of what it was in 1850. But even then there was not very much need for educating the consumer. When gas-stoves and gas-engines came into general use, undoubtedly there was another chance for gas companies taking up a somewhat different attitude upon the use of gas from what they had adopted before. Even then gas undertakings did not much concern themselves about the purchase of such stoves as were then in use, which consisted very largely of boiling rings and grillers, which could be had quite well from gasfitters and ironmongers, and were put into use more or less intelligently by the consumer. It was not until the introduction of the gas-range, or its general introduction, that gas managers saw that it was really their duty to take up the subject, and push the use of gas for cooking. In the interval which had passed since then, there had been a growing controversy as to what was the gas company's proper province, and what was the tradesman's proper province. A good deal of heated discussion had taken place, and offence had been given and taken, in connection with the department of fittings; but he had always held that gas companies were certainly within their rights and their duties in connection with the hiring of gas-stoves and the pushing of them, and that tradesmen neglected the duty they had, and never rose to the occasion—never really appreciated the sale of stoves to the extent that they might have done. If they had done it to any great extent, he had no doubt but that gas companies would have been content to stand aside on this question. It seemed to him, however, that the question had become very clamant; and in the set of rules Mr. M'Lusky had most diplomatically—and, he thought, most thoroughly—met all the difficulties which had presented themselves there and elsewhere. He conceived that no better set of rules could be devised for towns of the size of Perth, where they could be put into use; although he agreed that there were many small towns in which such a scheme could hardly be carried out, or rather in which the neccessities of the case did not call for such a complete system. But, in connection with the idea Mr. M'Lusky had put before them, it seemed to him to show how far gas managers had travelled. They found that when Mr. M'Gilchrist read his paper in 1888, his ideas, then not quite realized, had now been fully realized, though he did not think that sufficient use had been made of the table which the Association had printed for circulation and distribution to architects and tradesmen in connection with the sizes of gas-pipes. If the table were reprinted and distributed, he considered architects would be fully informed, and could put it into use when they were erecting new buildings. It was all very well to decry architects; but if they had not the information before them, how were they to carry out these details? They could not refrain from agreeing with Mr. M'Lusky when they came to his ideal that it was necessary now to unify the interests of the gas supplier, the gasfitter, and the consumer. He had done a great deal to realize this; and he thought that many who had heard him would be able to put into practice some of the ideas he so properly suggested as to gas in the house.

Mr. J. W. Napier (Alloa) said that if they obtained the sympathy of architects, they would, in his opinion, do a great deal indeed in determining their object. In Alloa he had drawn up a set of regulations for architects in the preparation of their specifications. So far as the proper sizes of the pipes was concerned, that was a point which no longer troubled them. Mr. M'Lusky said that gas companies or corporations should establish a central wholesale store from which to sell to the trade only. He was somewhat inclined to the opinion that this would not be a practical mode of working. He thought that the interest of the gas department consisted essentially of educating consumers. This was best done within the gas department, and not through the intermediary suggested—plumbers or gasfitters—whose interests immediately ceased once they had fitted the apparatus. In order to thoroughly carry out this matter in an efficient manner, the gas department must take up, thoroughly and enthusiastically, the fitting up of incandescent burners. He was inclined to think that if they could get gasfitters to come to a central store for all burners and accessories, it would work very well; but considering the condition of the trade in the matter of incandescent burners and mantles, the traders would, in their own interest, be inclined to buy them where they were cheapest, and where, so far as their interest was concerned, they were best suited. Consequently, he believed that the gas department ought to still more, and wholly, control the supply and fitting up of incandescent burners, together with their maintenance for a certain period; and, as Mr. M'Lusky mentioned, on a scale of charges covering net outlays.

Mr. J. M'Farlane (Maybole) said there was one point he should like to hear Mr. M'Lusky's views upon, that was the question of responsibility in the case of the gas company or corporation doing the work of fitting themselves. Take the average gasfitter, more especially in small towns, such as the one he was in, if he made a mistake—if there was a leak, and some person died in consequence of the escape of gas—nothing could be done to the man, because nothing could be got from him. But what would be the result if the same thing happened in connection with fittings put in by a gas company or corporation? Would they not lay themselves open to claims for damages? It was not so long since he saw that a gas company in England were landed in a claim by a doctor. He thought the company had to pay £500. This was on account of one of their workmen having left out a plug in fitting a gas-fire. He had been wondering, supposing the Company he represented were landed in such a claim, where they would be for that year, and for several years afterwards. He would like to know whether Mr. M'Lusky thought there would be any danger of loss to the Company in such a case. He quite agreed with the author's scheme for employing the gasfitters to stand between them and the consumers. But he would be prepared to let the gasfitters take the responsibility, and not rush in and take the responsibilities themselves, as Mr. M'Lusky seemed to indicate in his No. 5 regulation. He would like very well to know exactly how they stood in relation to the law of Scotland in the matter before them.

Mr. W. Carmichael Peebles (Edinburgh) thought that the matter of getting power to enter houses and testing gas-pipes would be a mistake. There was not only the testing for soundness, but there was the testing of the supply of gas through the pipes. Through bad fitting and carelessness, very often they found that pipes which should pass a certain quantity of gas were retarding it. Very often the joints had been allowed to get over the nose of a pipe, and thereby stop the supply. If the inspection which took place in the wiring of houses were extended to the piping, he was sure they would get over many difficulties in the supply of gas. As for the burners, he thought the question of pressure lay at the bottom of a very great deal of the trouble in gas installations. Bad burners did a great deal of mischief; but if they had the pressure there, the opening of the air spaces, so as to give more air, in many cases could be fairly easily attended to. And once they got the proper admixture for the district, or the burner supplied, they would get over the difficulty they had with bad burners. The quality of the article was a matter for the consumer. If he bought a bad article, he would not get so much out of it as if he paid more. He thought Mr. Napier was dealing with the matter of the specifications in a proper manner. He was afraid their gasfitter friends did not rise to the occasion at all. The amount of ignorance to be found in the piping of houses and the running of gas-pipes generally was marvellous; and the knowledge that a great many gasfitters had was almost worse than useless. He did not think gasfitters took up this matter as they ought to do. He had found them asking how to read a pressure-gauge, which was one of the simplest things possible. If they found simple things like this requiring explanation, they could imagine other questions arising which would require to be dealt with. He knew that Mr. M'Lusky had made a study of the question of gas-fittings, and that he was bringing the influence of his Gas Department and his knowledge to bear on the proper piping of houses, and the using of scientific means for giving good value for money. A paper like this, from a man who had studied the question as Mr. M'Lusky had, was most valuable.

Mr. W. F. Vernon (Coupar Angus) said Mr. M'Lusky referred to the fitting of houses, as executed by plumbers or gasfitters. From his own experience, he had always found that this had been done in a slipshod manner, and on an unscientific principle

entirely, and not at all adapted to modern requirements of gas lighting, more especially incandescent lighting. He thought that a note of caution should be issued by every gas company to the public, warning them against purchasing inferior burners for incandescent lights. Those nostrums which the German Jews sold were practically worthless; but they charged as much to their consumers for these goods as the consumers would pay if they bought direct from the company, and much more. He fully agreed with Mr. M'Lusky that it was the duty of gas managers to oversee the fittings of all houses that were to be supplied with gas; and he was sure if this were done, many causes of complaint would be avoided.

Mr. A. MACKAY (Montrose) said that, since he went to Montrose, he had taken up the dealing in the whole of the gas-lighting materials; and he had done this at the very lowest profit it was possible to be done at—in fact, in making up his balance-sheet, he found he had lost 5s. in this direction. He gave the burners for what he bought them—that was, after paying the carriage and other charges. They had been told to give the consumers pressure and let them regulate the gas and the air supply. He considered this was altogether wrong. They should give the consumers burners which they would not require to touch after they received them, because, when they got bad burners, they usually went to the gasfitters, and, he was sorry to say, the majority of these were entirely ignorant as to incandescent lighting. In one case one of his shareholders came to him and said he would have to do something in the way of using electricity if he could not get better light from his incandescent gas-burner. The burner had been bought from a local plumber. He went himself to see what was wrong. He found that the burner had been altered by a new cylinder having been put in and the air-diverter left. A plumber had been at the house three times, and could not see what was wrong. He put the thing right; and it looked to the occupier of the house like a miracle. The proposal of Mr. M'Lusky as to the gasfitters was certainly a good one. An arrangement of this kind would not cost them very much. His object in taking up the work of supplying fittings was that the summer before he went to Montrose, the plumbers, instead of doing anything for the Gas Company, canvassed the town for the Electric Light Company, so that they might get work from that source.

The PRESIDENT was very pleased that the paper had provoked such a long discussion. He thought there could be no two opinions with regard to the flat-flame burner being an unsuitable one to use; but to say that the incandescent burner, used in the haphazard way it was, was as bad, he did not think was hardly right. Still, there was a waste; and the question came to be, How was this to be prevented? The question naturally arose, too, Who was the party who should try to prevent it? There could be no doubt at all that it was the gas supplier who ought to educate the consumer into using the incandescent burner as it ought to be used. Mr. Macfie mentioned that gas companies took very great interest in consumers at one time, before meters were introduced, which was very probable. He hardly blamed the gasfitters for all the faults they found in the fittings of houses; he blamed the architects, because they were the parties who specified what was to be put in.

Mr. J. HALL (St. Andrews) objected to this remark. The matter, he considered, was entirely in the hands of the gasfitters.

The PRESIDENT, continuing, said he thought, all the same, that the architects should look better after this matter than they did. He considered that Mr. M'Lusky's recommendations should be acceptable to the trade. He did not altogether, however, go so far as he did. He was not so very sure of employing fitters of their own for work of this kind. For certain work he was quite agreeable. Mr. M'Lusky recommended having a card with the names of traders that he could recommend put in a show-room. Would it not be a better plan, if they had confidence in these men, to employ them to do the work? And if the men were agreeable to come to their show-room to buy fittings, and to carry out their instructions, and were agreeable that they should superintend their work, what more did they want? He thought the other way would cause friction. If they had to compete against the electric light, they must do something to remedy the existing state of matters, and to show their consumers that gas, when properly handled, was the best and most economical light.

Mr. M'LUSKY said, with their permission, he would reply to the discussion backwards. He wished to clear up a misunderstanding on the part of the President with regard to the amount of loss with the incandescent system of lighting. The statement in the paper was to the effect that there was a proportionate loss with incandescent lighting. But if there was a preventible loss of 25 per cent. with ordinary burners, some of the incandescent burners were little, if any, better than the ordinary burners; and, as a matter of fact, in Scotland there had been more cases of increased gas bills arising from the introduction of incandescent burners than there had been from the change from one flat-flame burner to another. It had been no uncommon experience to find incandescent burners consuming 5 cubic feet per hour; and flat-flamers, in many cases, did not consume more than 3 or 4 cubic feet. It might not be so at the present time; but in the days of enrichment it was so—and those were the days when the incandescent system was finding a footing. The President would not agree to the employment of fitters by corporations, but would like to employ the traders' fitters. This was exactly what he had proposed. It was unification that he suggested—that the gas department and the gasfitters should combine; that the gasfitters would receive orders, and that, on the other hand, the gas department should act as agents for the fitters; but that in no case would the gas department do any work in the fitting up of the burners unless they were called upon to do so as agents of the fitters. Mr. Hall blamed the fitters; but he (Mr. M'Lusky) did not think it was fair to attach blame to them. If the gas department would lend their aid, there would be no blame attachable. If they took up the matter, there was no doubt that they would have a large increase of trade; and he believed that the association of ideas between the gasfitters and the gas department would help in this respect. If the gasfitters were not with them, they would be against them; and he considered it better to work with the fitters. Mr. Vernon's complaint about the German Jews was an old one in the days of flat-flame lighting. The itinerant vendor had no difficulty in getting 6½d. each for burners which had been rejected by a maker and sold as a job lot, or thrown on the scrap heap. Mr. M'Farlane raised the question of responsibility. Parliamentary protection, of course, would adjust that; but they must bear in mind that no amount of legislation would save life. Responsibility would be always the same. Mr. Napier considered that sympathetic working with the architects would solve the problem better than the adoption of the scheme in the paper. He might say that he had had 15 years' experience of sympathetic working with architects; and he had had no difficulty. He had had a like experience in working with traders and gasfitters. He had always found them sympathetic, and had had the very best results accruing from co-operation with them. They all knew that Mr. Macfie had made many valuable contributions upon the subject of fittings in other places. His remarks about the supervision of fittings before the introduction of meters were very pertinent to the discussion. The introduction of stoves raised the question of the responsibility for the re-fitting of houses. They had many cases where the supply was sufficient, but, when a stove was introduced, it was not sufficient, and the landlord very naturally turned round to the gas department and said it was their duty to make the gas supply sufficient. This was, he thought, a very reasonable demand. Mr. Macfie suggested that a less elaborate scheme would do for small towns. That was quite true; but in small towns, they must remember, gas managers were in the habit of calling upon consumers probably four times in the year, and thus the inspection and supervision of fittings was being constantly attended to. Mr. Yuill proposed to seek parliamentary powers for inspection. He was the pioneer. He had proved himself so; and if he were successful in starting the hare, he was sure there would be a great many followers in this regard. He had hoped that Mr. Yuill would have dealt with the free stoves question. His object in referring to Mr. M'Gilchrist's remarks was to show that 17 years ago the question of meter-rents was the burning one throughout Scotland. It was very often made a question at municipal elections. He wondered how long it would be before they realized that a free cooker was as necessary as a free meter. Mr. Robertson agreed almost entirely with the scheme he proposed, and welcomed it as the best solution of the problem he could find. He himself had also felt the effect of competition in the cutting of prices in the gasfitting trade. Perhaps the most important question Mr. Robertson had raised was the effect the scheme would have in increasing the gas managers' duties. He thought gas managers were full of resource. They had always been able so far to take up any number of increased duties, and some were able to undertake work outside their ordinary gas-works duties. In many cases in England the gas manager controlled the electric lighting and water as well as gas; and he was quite sure that the control of a department such as he had recommended would not increase the gas manager's work, because complaints existed at the present time. If they could initiate a scheme whereby these complaints would be brought to them first-hand and satisfactorily dealt with, he was sure they would pave the way for more satisfactory working, and that, while the work might be increased to some extent, the worry would be decreased, and more satisfactory results all round would accrue.

COMPETITION OF TO-DAY.

By ALLAN REID, of Brechin.

[A Paper read before the North British Association of Gas Managers.]

In appearing before you to-day, to introduce a subject in which we are all more or less particularly interested, there is only time to touch on the fringe of one or two of the features of my subject with which I have been in contact during the past five years. For want of a better name, I entitle my paper "Competition of To-day;" and I wish, at the outset, to remark that these notes have been prepared with the idea of helping any brother manager who may be placed in circumstances similar to my own. I think I cannot commence better than by describing the steps taken by the Commissioners in my own city, as the result of which we now have in our midst an electric undertaking. In 1897, a Provisional

Order was granted by the Board of Trade to the Brechin Burgh Commissioners for the purpose of electric lighting in the city of Brechin. This Order was eventually taken over by a well-known firm of electrical engineers, who did the preliminary work and then transferred the Order to the present Company—viz., the North of Scotland Electric Light and Power Company, Limited. This Company works both Montrose and Brechin, and is putting in an installation at Inverness under a similar Order.

The terms of agreement between the Town Council and the Electric Company in both cases are shortly as follows: (1) The plant, works, and business of the Company may be acquired by the Corporation after the expiration of ten and up to fifteen years from the date of the agreement in 1897, by repaying to the Company their capital outlay and 15 per cent. premium. (2) During the next five years—*i.e.*, from 15 to 20 years after the date of the Order—by repaying the capital sum and 10 per cent. premium. (3) During the next five years—*i.e.*, from 20 to 25 years after the date of the Order—by repaying the capital sum and 5 per cent. premium. (4) After the expiration of 25 years, by repaying the capital sum only. The Commissioners are bound to take a supply of electricity for public lighting in all streets in which the Company's cables are laid; the price fixed being on the same basis as that paid for gas in the year 1897—"light for light," "money for money." The prospectus was issued in January, 1900, the works were commenced in that year, and the current was turned on in July, 1901.

I know well that every gas undertaking which has electricity as a competitor has to meet it and fight it; but I think you will agree that the manager of a private company has more difficulty, and is handicapped in his contest against the electric light, as compared with his brother manager who has charge of a corporation gas-works.

It is unnecessary for me to go into particulars as to the price of electricity compared with gas, as we are well aware that the former cannot successfully compete on the basis of candle power. At present, many corporations are very unsettled regarding their public lighting, and in some notable cases have dispensed with electric light and re-introduced gas on a system of high-pressure lighting. This has been done after exhaustive and conclusive tests, in which it has been clearly and satisfactorily proved that arc lighting is "not in it" with intensified gas.

I would advise any of you in places of small size—like my own town of Brechin, with a population of under 10,000—when you are face to face with an electric installation, to be very watchful as to the laying of the cables. A great amount of work and worry was caused by broken pipes, &c., which were the outcome of careless work in laying down the new cable. I intimated to the Electric Company, when they began operations in the streets, that for any breakages of main or service pipes caused by their workmen, they would be held responsible. We kept a very sharp watch over them and examined their trenches twice a day. After the first area was completed, the Burgh Surveyor ordered the road-roller to go over their trenches, and it was found, as we anticipated, that they were far too loosely filled up, with the natural result that, within quite a small area, we had five main pipes and twenty services broken or damaged. This happened on a Thursday afternoon in the beginning of November; and all the evening and night—when we should have been making up stock—we were losing gas at a tremendous rate, and it was Friday at noon ere we got all the breakages attended to. My Company entered a claim against the Electric Company for damages and loss of gas, restricted to the very moderate figure of £30; and after much haggling and various suggestions as to settlement, we received £25 in full discharge. We had little or no further trouble from this source.

In 1900, our make of gas was approximately 20,500,000 cubic feet, and the price was 5s. per 1000 feet. Up to this time our Company, in recent years, had shown little progress—as was to be expected without opposition. I am proud to say, however, that when the pinch began to be felt, my Directors rose to the occasion—went into the matter as business men should do, and gave me every assistance, co-operation, and encouragement in competing against our new rival. A show-room was opened, where we exhibited all appliances for the consumption of gas—high-pressure and self-intensifying lamps, all the latest improvements in incandescent gas lighting, and so forth. We took over the maintenance of the remaining street-lamps, kept up consumers' incandescent fittings ourselves, and pushed things as hard as possible. We erected self-intensifying lamps in some of the main streets, showing the difference between the two lights to be so great that in the "Dundee Advertiser" for Oct. 3, 1903, the following paragraph appeared:—

> The best lighted corner in Scotland is claimed for Brechin. It is questionable if anywhere within the borders of the country there would be found a more brilliantly illuminated corner than that extending from the Post Office to the City Hall. Here an active contest is going on between the Gas Company and the Electric Light Company as to what can be done in the way of lighting with the respective systems; and within a radius of 100 yards no fewer than eight lamps are to be found whose combined power must be well over 6000-candle power. The unique contest is exciting considerable interest in the community; and every night large crowds collect in the vicinity to enjoy the illumination and discuss the respective merits of the lights—old and new.

And again on Nov. 9:—

> There is a great competition between gas and electricity in the streets of Brechin; and gas is more than holding its own. The contest between the two Companies is attracting much attention, and, after all, the palm is being awarded to the old light. Some of the incandescent lights put up by the Gas Company are making the electric lights appear, by comparison, but feeble flickers. This is notably the case at the Post Office. At the door of this building is a double electric light; and a few yards away, above the public clock, a magnificent lamp has been erected by subscription, with three incandescent gas-lights, which irradiate the whole neighbourhood and put the new "light of the future" into the background entirely.

We also pushed cookers, fires, &c.; and to-day we have over 400 cooking-stoves in operation, and about 1000 rings and grills, with 1200 prepayment meters. The present price of gas is 4s. 4d. for lighting and 3s. 6d. for cooking, heating, &c. Our make of gas this year was 24,000,000 cubic feet; so that, notwithstanding electric lighting in Brechin, the production of gas has increased by 3,500,000 cubic feet in four years, or 14·5 per cent.

I would like, here, to put in a word for prepayment meters. It is my honest conviction that, if it had not been for these meters, our Company would have been in anything but a flourishing condition. Each meter averages about 27s. 6d. per annum. It is to be remembered that a very large proportion of this class of consumer used only oil, and would not consume gas because of the bill coming in at the end of the quarter. The prepayment meter has saved the situation in Brechin, and the outlay involved has proved a first-class investment.

The writer has a strong presentiment that if incandescent gas lighting had been properly looked after, and advocated as is now done, say eight, or even five, years ago, electricity would never have had the hold in small places that it has now. Gas companies refused to face the situation until they were forced to do so. It seems curious that local business men who usually make up the Boards of Directors should not put anything like the zeal and forethought into the management of the companies that they do into their own private businesses. Only when the gas consumption begins steadily to decrease do they see that something must be done—instead of which it ought to be their aim to popularize the commodity they have to sell before competition actually begins. How often is the steed stolen ere the door is locked!

The manager in a small town has, however, an advantage over his brother in the large cities, in this respect, that personally he is known to a large majority of the consumers, and the right man can use his personal influence to push the business of the company or corporation he represents. He should make himself familiar with all the latest appliances in the way of lighting, heating, cooking, and motive power; and his experience should be placed unreservedly at the service of his customers. One of our difficulties is found in the erection of new houses and buildings. Very often the builders wire them, and do not put in gas-piping at all. Though the tenants prefer gas, and might even go the length of paying part of the cost of the installation, they are prevented because of the damage to walls and floors. Other builders may take in a supply pipe and leave it to the gas company to connect a stove if required. In cases like this, it would pay to give the very best terms, and even go the length of putting in the main or service pipes free. Another source of worry is the inadequate size of pipes in most of the old class of working men's houses. A very general size is a $\frac{3}{8}$-inch service-pipe, with $\frac{1}{4}$-inch branches; and even in new buildings one gets them putting in a $\frac{3}{8}$-inch, when it should be a $\frac{3}{4}$-inch. This is a very important point; and if we could get architects and builders to see this from a thoroughly business point of view, I have not the least doubt that better results would be the outcome to both parties.

Gas managers might do worse than turn their attention to the lighting of places of worship; for in many instances congregations sit in darkness not always lighted by the "star" in the pulpit. Here, as in many other places, incandescent lighting is not only a means of saving money to the customer and trebling the quantity of light, but is also a powerful and lasting advertisement in favour of gas lighting. Last year I persuaded one of our churches (just on the verge of introducing the electric light) to let us have a few incandescent burners put in on trial. They agreed to this; and I fitted up 28 burners with "Calypso" globes, and lit the whole building very successfully. The saving for the six months was £4 10s. 8d.; and the result was the receipt of several orders of a similar kind.

We have very little to fear in comparing the electric motor with a gas-engine, even with gas at 3s. 6d. per 1000 cubic feet. Any motor-users in Brechin who have changed to electricity have done so almost entirely because of the economy in space of the electric motor; but they find, along with the additional room given them, that they have about 30 per cent. more to pay for their power. Mr. Canning, of Newport, gives the following test of a gas-engine and an electric-motor, both doing the same class of work: Consumption of gas, 110 cubic feet; electricity, 4·38 units. This shows that electricity must be sold at 1d. per unit for power to compete against gas at 3s. 6d. per 1000 cubic feet.

We have not only electric motors to consider, but shortly we may have a powerful competitor to face in the shape of suction or power gas. Gas-engine manufacturers are now making power-gas plants; and these are rapidly becoming more general in this country. To compete against these, gas must be sold at a very low price; and the time is not far distant when gas undertakings will be forced to hire out not only fires and cooking-stoves, but engines and other appliances in which to use their gas, the same as is now done by electric companies with their motors. It is expedient and necessary that we should have our distribution

department at its very best. Let us advertise, and, above all, let us educate our consumers.

I am strongly of opinion that, first and foremost, the best and most profitable way of meeting competition is by reduction of illuminating power. It is not so long ago that 28 and 30 candle power was looked for in Scottish towns; but these days are gone, and no doubt within a very few years 16 to 18 candles will be looked on as high enough. In my opinion, it is quite sufficient, and, in conjunction with advanced incandescent lighting, nothing better is required. No doubt, we will have yet greater competition in the future than in the past—both from electricity and from power gas; and the simplest way to meet the competition seems to be by reducing the illuminating power. Combinations are now being formed, not only of burghs, but of whole districts; and it will be wise for gas companies and corporations to give this phase of the question the attention it requires in plenty of time.

On looking over the statistics, Scottish gas undertakings can be classed thus:—

Works making over 100,000,000 cubic feet	15
,, ,, 50,000,000 ,,	15
,, ,, 20,000,000 ,,	36
,, ,, 10,000,000 ,,	34
,, under 10,000,000 ,,	160

It will be seen by this table that there are only 30 works making over 50 millions, or about 11 per cent. of the total undertakings; 14 per cent. are over 20 millions and under 50 millions; the other 75 per cent. are all under 20 millions. As to public electric undertakings, as far as I can make out, there must be about 45 in Scotland.

I have compiled a table showing the increase of gas manufactured in twelve towns during the past four years; the electric light being in opposition in each case:—

	1900. Cubic Feet.	1904. Cubic Feet.	Increase Per Cent. in 4 years.
Glasgow	5,969,110,000	6,641,891,000	10·1
Dundee	622,304,000	698,846,000	10·9
Aberdeen	567,956,000	649,049,000	12·5
Perth	160,000,000	187,119,000	14·5
Coatbridge	128,262,000	144,676,000	11·3
Falkirk	114,000,000	151,090,000	24·5
Kirkcaldy	115,000,000	138,617,000	17·0
Dumfries	85,000,000	97,597,000	12·9
Alloa	71,173,000	97,009,000	26·8
Hawick	63,318,000	73,969,000	14·1
Brechin	20,730,000	23,896,000	13·2
Melrose	6,000,000	7,387,000	18·7

We must remember that the large cities and towns have had the electric light competing against them for twenty years; and it is gratifying to us in the smaller places that, notwithstanding all the advantages claimed for electricity, gas still holds the supreme position in those very places where electricity should have a particularly strong hold.

Discussion.

The PRESIDENT said Mr. Reid was one of their younger members; and he hoped his example in coming forward and giving his experience would be an incentive to other young members of the Association to do likewise.

Mr. W. CURRIE (Alexandria) congratulated Mr. Reid, not only upon his paper, but upon the result of his struggle with the Electric Light Company. There was no doubt about the necessity of their being up and doing. They were threatened on all sides. Some of them who had hitherto enjoyed immunity from the competition with electricity could not hope to enjoy it much longer. He was glad to say that in the Vale of Leven, when the Electric Company applied for powers, they escaped so far as public lighting was concerned. They had not yet given them trouble; but he had all along been carrying on preparations against their coming, because he believed that by and bye they would come. He had been going pretty much upon the same lines as were indicated by Mr. Reid. He had not gone quite the length of giving free stoves; but he gave free grillers—any number of them. This season they would give away 200 or so, in addition to other forms of gas apparatus. He considered it was highly important that they should have an official inspection of gas-fittings. There was no doubt but that the electric light, apart altogether from other questions, would become a very serious competitor; but if they could give gas at a fair price, and attend to the consumers—keep in close touch with them—many of them, when the time came, might have a record such as Mr. Reid had given that day.

Mr. W. BLAIR (Helensburgh) said that, in his experience, extending over a good many years, he found that the greatest number of complaints as to bad gas were due to inefficient fittings. The fault lay between the architect and the gasfitter; but the gasfitter, as the practical man, should have seen that larger fittings were really necessary. In Helensburgh, this had been the great complaint. They had six, seven, and eight roomed houses fitted with 3-light meters and ⅜-inch pipes. They had three and four roomed houses fitted with No. 0 meters. In many cases fitters were inexperienced in the fitting up of the incandescent light. Complaints were sent to the gas office; and he attended to them personally. He found that the complaints were the result mostly of the fittings being too small, or of there being a want of cleaning. The more personal supervision they had, the better would they be able to educate fitters in the work of attending to complaints, and the better would they be able to fight any competitor who might be in the market.

Mr. A. MACKAY (Montrose) said he was very much in the same position as Mr. Reid, being opposed by the same Company in Montrose as he was in Brechin; the local Council being tied down to taking electricity whenever the Company required them. The cost for street lighting with gas in 1899 was £388; in 1900, it was £392; in 1901, £450; and in 1905, the Gas Company's revenue from the town was £88. So that, practically speaking, when gas alone was used for street lighting, they might take it, on an average, at £400 per year. This was something like 2¾d. per pound on the rates. As Mr. Reid had indicated, electricity was started on the same basis; but it rose to 3d., and last year it was 4½d. The income the Electric Company had last year for street lighting was about £1000, against the Gas Company's charge of £400. Thus, the amount paid in Montrose for street lighting was more than double what it was when gas was used. Mr. Mackay read quotations from a newspaper article, in which the disappointing effect of the electric lighting in Montrose as compared with gas lighting was dwelt upon, and went on to say that he had had difficulty in putting new services in the town because of the presence of the electric cables. The practice was to lay a brick on the top of the cable, and very often but for that brick his men's picks would have been through the cable. Another difficulty might be pointed out, that was in connection with the wiring of houses in which there were gas-pipes. He was not going to say who did it, but those pipes were almost always damaged, if they were not thrown out altogether. He had taken the matter up, and he found that, when tenants were dissatisfied with electricity, they would not come and ask for gas to be put in again; and, of course, it was practically impossible for them to get it, because the landlord would not allow the house to be again fitted up. He had begun to put the damaged pipes right, and to supply new piping altogether—doing the work practically for the cost of the material. He was glad to say that this had had the desired effect, and that for some time he had not had any trouble from this source. Church lighting was a matter he thought they should all give their attention to. He found it was one of the best means of advertising their light. In doing this work he used No. 3 Kern burners. Although they were more expensive to begin with, they had more satisfaction with them, and they gave less trouble. In a great many cases he had consumers coming to him and asking to let them have a light the same as in such and such a church. He found the oil-lamp was giving him more trouble than the electric light, because, as a matter of fact, people came into the town who had lived in the country, and they were afraid to use gas; so they got for themselves a lamp and oil, until the Company went and persuaded them to have a prepayment meter. He had been pretty successful in this policy, and he might say that the prepayment meter had been a good friend to them in Montrose.

The PRESIDENT was sure they had listened with very great interest to Mr. Reid's paper. When he read it, he thought the author must have been put about a good deal when he knew that the Electric Company were to invade Brechin; but Mr. Reid had shown that he did not lie down softly. With commendable pluck and hard work and attention to consumers' wants, he had been able to show a very large increase in the consumption of gas. The keynote apparently of Mr. Reid's success was effective pushing. He had shown how this could be done—by advertising and exhibitions, the giving out of stoves, prepayment meters, and free mantles. He thought the latter was essential, and was the right method to adopt, if they were wanting to keep their consumers burning gas as against electric light. Regarding Mr. Mackay's remarks, it seemed to him that the proprietors of houses were having very happy times in Montrose. They could get the Gas Company to do anything they wanted to the pipes and fittings in their houses; and the Electricity Company were quite willing to do anything in the fitting up of houses for their light. It was changed altogether now. The lines of the proprietors seemed to have fallen in very pleasant places indeed.

Mr. REID, in closing the discussion, said, in regard to Mr. Mackay's remarks, that he had also had the same difficulty about the distance of the electric cables from the gas-mains. He forced them to put the cable 6 inches from the main. This could not always be done with service-pipes, but it mostly always could with mains. It was very important to see that the cable was kept at least 6 inches away from the gas-main. Mr. Currie said he did not expect the electric light people would get the public lighting; and he was very glad to hear that. He did not think the electric light would ever be a success in a small town unless they obtained the public lighting, because they depended so much upon their maximum load; and whenever they got the public lighting, they could put away a large quantity of current at a lower price. As to oil lighting, this was almost at an end with him. A man used to come three times a week selling oil, and he sold large quantities; but they never saw him now.

By way of inaugurating the Simplon Tunnel, which is fast approaching completion, an "International Exhibition of Means of Transport by Land, Aëronautics, and Metrology" is to be opened in Milan in May next. The exhibits will include gas factories and electrical installations for the lighting of railway carriages and stations.

TRIALS OF GAS-ENGINES WORKED FROM SUCTION GAS-PRODUCERS.

The following preliminary report on trials made at this year's Glasgow show of the Highland and Agricultural Society of Scotland of gas-engines worked from suction gas-producers, has been published by the "Gas and Oil Engine Record."

The object in issuing this preliminary report immediately on the completion of the trials is to place in the hands of the exhibitors and others interested a few general particulars as to some of the chief results obtained. What is here printed must not be taken as representing in any way the final finding of the Committee; a further and complete report will be published later. In order to obtain reasonably correct results as to fuel consumption, every possible precaution was taken to bring the fuel, &c., in each producer at the end of a trial into the same condition as at the beginning. In this respect, considerable difficulty was met, as the design of most of the producers is such as to render it almost impossible to gauge accurately the state of the fire as to ash and clinker. There is no difficulty in removing the ash, &c., from the immediate vicinity of the fire-door, but in the majority of the producers it is impossible to extract the ash, &c., from the back of the fire without bringing down most, if not all, of the fuel in the producer.

By making the duration of each power trial ten hours, it is considered that any error in arriving at an estimate of the fuel consumption will be minimized. At the same time, in view of the extraordinarily small amount of coal used in some of the plants, it is necessary to draw attention to the fact that the figures given below may be slightly under the true value, though the degree of error cannot be large. Each plant was required to undergo a full and half power trial of not less than ten hours, also a light-load trial of a period of five hours. In the light-load trial, the coal consumption was not measured, as the object was rather to ascertain the capabilities of the producers to supply gas to the engines when running without any load. All the plants completed this light-load trial satisfactorily. A further test was made to ascertain the time required to get a plant up to full working load, starting with the producer empty and cold.

At the end of the first three days' trials, the producers were emptied and examination made for clinkering. Very little clinker was found in any of the producers; there was most in the Dowson producers—used by the National Gas Engine Company. This may be accounted for by the fact that practically no provision is made in this producer for clearing out the ash and clinker while in operation. Scotch anthracite "peas," from Gartshore Colliery, and supplied by Mr. James Cunninghame, of Glasgow, were used throughout the trials; and the indicators were supplied by Messrs. Dobbie, M'Innes, Limited, of Glasgow.

Particulars of Gas Engines and Producers.

Exhibitor.	Catalogue Reference.	Engine. B.H.P. Declared.	Engine. Diameter of Cylinder. Inches.	Engine. Stroke. Inches.	Engine. Revs. per Minute.	Producer. Capacity. Cubic Feet.
The Campbell Gas-Engine Company	A (*a*)	18	9½	18	200	4·18
	(*b*)	8	7	12	230	2·26
The Industrial Engineering Company	B (*a*)	22	10	17	220	4·08
	(*b*)	13½	8½	14	230	2·17
Tangyes, Limited	C (*a*)	19	10	19	190	2·36
	(*b*)	7½	7	16	220	1·59
National Gas-Engine Company	D (*a*)	8	7	15	220	2·98
	(*b*)	20	10	18	190	5·89
Crossley Bros., Limited	E	18	8½	20	200	4·31
Acme Engine Company	F	22	10	17	220	Not taken.

Results of Trials. Plants which had Engine and Producer Defects.

	Catalogue Reference.	Full Load Trial. Duration of Trial: Hours.	Full Load Trial. B.H.P.	Full Load Trial. Coal per B.H.P. per Hour: Lbs.	Half Load Trial. Duration of Trial: Hours.	Half Load Trial. B.H.P.	Half Load Trial. Coal per B.H.P. per Hour: Lbs.	Remarks.
The National Gas-Engine Company	D (*b*)	10	20·57	0·80	10	10·48	0·95	8 mins. stop during half-load trial due to carbon deposits on igniting points.
The Campbell Gas-Engine Company	A (*b*)	10	8·25	1·22	10	4·43	0·94	Load on brake relieved for 2 mins.; and engine stopped for a few seconds to replace a pin on ignition gear.
Tangyes, Limited	C (*b*)	10	8·34	1·25	10	4·57	1·48	Load off for 9½ mins. on full-load trial due to poor Gas; engine did not stop.
Crossley Bros., Limited	E	8·12	15·35	0·77	10	9·06	0·96	Stopped during full-load trial owing to shortage of water in producer. Load on brake relieved during half-load trial—premature ignition.
Industrial Engineering Company	B (*b*)	10	9·72	1·13	8·43	4·36	1·55	Stopped on half-load trial owing to defect in producer.

Plants which Completed the Trials without a Stop of any Description.

	Catalogue Reference.	Full Load Trial. Duration of Trial: Hours.	Full Load Trial. B.H.P.	Full Load Trial. Coal per B.H.P. per hour: Lbs.	Half Load Trial. Duration of Trial: Hours.	Half Load Trial. B.H.P.	Half Load Trial. Coal per B.H.P. per hour: Lbs.
The National Gas-Engine Company	D (*a*)	10	9·74	0·84	10	5·36	0·91
The Campbell Gas-Engine Company	A (*a*)	10	20·44	0·93	10	10·69	0·92
Tangyes, Limited	C (*a*)	10	19·98	0·83	10	10·72	1·08

The Acme Engine Company (F).—The engine was not ready to start at commencement of trial, and was not subjected to any complete tests.

The Industrial Engineering Company B (*a*).—During full-load trial the engine was compelled to stop owing to heated bearing, and on the half-load trial there were several stops, causing the results to be so unreliable as to render the trial of no value.

In arriving at the above results as to coal consumption, due allowance has been made for ash and clinker.

TIME TAKEN TO GET UP EACH PLANT TO FULL WORKING LOAD.

The Campbell Gas-Engine Company	A (*a*)	13 Minutes.	The Acme Engine Company	F Did not start.
	(*b*)	17½ ,,	The Industrial Engineering Company	B (*a*) Failed to start through water passing into cylinder from producer.
Tangyes, Limited	C (*a*)	16 ,,		(*b*) Started, but was compelled to stop through water being shut off at main.
	(*b*)	12½ ,,		
The National Gas-Engine Company	D (*a*)	15¾ ,,		
	(*b*)	48 ,,		
Crossley, Brothers	E	15½ ,,		

Before the publication of this preliminary report, the exhibitors were asked whether they had any comments to make thereon. The Campbell Gas-Engine Company, Tangyes, Limited, and the Dowson Economic Gas and Power Company stated that they would reserve any remarks they might have to make until the issue of the promised final report. From the other replies we have extracted the following particulars. As was stated in the "JOURNAL" for May 23 (p. 497), the object of the trials was to bring the "practical working of this form of motive power under the immediate notice of agriculturists and others, to whom a cheap and simple source of power is of the utmost importance." Each exhibitor was to show two complete plants, consisting of suction gas-producers and accessories, and suitable engines of between 5 and 8, and 15 and 20 horse power. In the entry form the cost of the plant had to be included; while the frequency with which the producer required charging and cleaning had also to be stated.

Messrs. Crossley Bros. say that, while in the main in full agreement with the report, there are a few points which require emphasis, and affect them somewhat. It is stated that in the majority of the producers it is impossible to extract the ash and clinker from the back of the fire without bringing down most, if not all, the fuel in the gas-producers. This was not the case with the producer they exhibited; which had four cleaning-doors, and no less than four poke-holes for poking in a vertical direction; there being far more provision in their producer than in any other exhibited. They consider that the test of their installation was in every way accurate, taking into account the exceptional cleaning facilities provided with their plants. This point requires emphasis, because a little later in the preliminary report it is stated, that "in view of the extraordinary small amount of coal used in some of the plants, it is necessary to draw attention to the fact that the figures given below may be slightly under their true value, though the degree of error cannot be large." As Messrs. Crossley's consumption was the lowest recorded, at first sight it would seem, they say, as if a reflection might be cast on their figures; but they think, in view of the exceptional cleaning facilities provided, the error in their test must have been very small—indeed, in actual tests at the shop with similar fuel to that used at Glasgow, the results came out lower still. The firm then go on to say: "At the same time we quite agree with the report that some of the results obtained pointed to sources of error, as we find some of them showing from 20 per cent. to 30 per cent. more economy at half-load than at full-load. This is an impossible result. Gas-engines governing on the hit-and-miss principle are generally 20 per cent. less economical at half-load than at full-load; and this applies to those of every make within very small limits of variation when working on the 'Otto' cycle. Comparing the results obtained, the only tests which conform to this reduction of economy at half-load in our opinion were those of Tangyes and ourselves. Further, next to ourselves Tangyes had the best facilities for cleaning purposes in their large generator; having two doors and one large poke-hole. In all cases showing extraordinary results, the plant had only one door and little or no poking facilities at all. Another point which is important is that the volume of the clinker in the producer, which could not be removed owing to defective cleaning arrangements, was not the most serious source of error. What was more serious was the fact that this clinker forms an arch inside the producer, and holding up the fuel-bed produces cavities therein, so causing a great source of error in estimating the fuel consumption. The chief offender in this respect—namely, the Dowson Gas Company—has been evidently corrected to a certain extent for the large amount of clinker found in their producers; but from our experience with such we consider this was not done to a sufficient extent. In the marginal notes referring to our test, it will be noted that during the full load trial we were unfortunate enough to run short of water in the gas-producer, and so spoil our full-load test, or we should have been much more economical than we were, and as we anticipated being. During the half-load trial it is stated we had a little premature ignition. This might have been the case, we certainly removed the brake for a period of five seconds; but whether the trouble was due to pre-ignition, we are not in a position to say—the fact remains we only had the load off five seconds."

The Industrial Engineering Company state that the consumption of 1·5 lbs. of coal given is considerably higher than in any plant they have yet made; and they think there must have been some mistake. They also question the correctness of the statement that the stoppage was due to fault in the plant. In reply to inquiries they learned that the tests were run on the following lines: Fuel consumptions taken, all engines rated as 10-horse power on the small engine test. As in the small engine the sizes of the cylinders vary considerably, they point out that the test is not a true one; and they add that "by these results ours come out at a far greater economy than any other."

The Acme Engine Company state that the trials and the results have to be looked at from two different points of view. First, the object was really to ascertain in a general way the efficiency and reliability of the suction gas-producer and engine. This the trials fully and satisfactorily demonstrated. As to the relative merits of the engines and producers, and their consumption of coal per horse power, these points have really not been so well brought out. Various causes contributed to this. In the first place, the trials were under such temporary conditions as to erection and manipulation as made it difficult for the engine-makers to, perhaps, do as well as they might have done under more permanent conditions. Some peculiar figures have resulted from the consumption results. Several of the engines, for instance, appear to have worked more economically at half load than they did at full load. Then some of the engines at full-load trials do not appear to have been working more than at two-thirds of their power. Therefore the figures, as comparative tests of the engines and producers, are of little or no value. This has arisen very largely from the fact that the plants were so small that an accurate measurement of the fuel was almost impossible, as the different forms of the producers lent themselves to various methods of charging them when the start was made; the method of procedure being that the producer was filled to the top, and the height of the fuel measured with a rod. After the test was over, the producer was again filled to the top and the measurements taken. While this was the best that could be done under the circumstances, it was rather a crude way, and made it impossible to arrive at an absolutely accurate result, as with these small engines a few pounds of fuel more or less at the charging or finish made all the difference in the tabulated results as to consumption.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Wednesday, July 26.

(*Before Mr. Justice* LAWRANCE *and a Special Jury.*)

Ocean Accident and Guarantee Corporation, Limited, and Franklin and Hawkesley v. Ilford Gas Company.

The plaintiffs, who are owners and mortgagees in possession of certain lands and houses at Little Ilford, claimed damages in respect of injury caused by the alleged negligence and breach of duty on the part of the defendants. The claim arose out of the act of defendants in stopping up and obstructing an ancient watercourse known as the Aldersbrook, running through their land; thereby interfering with the natural course of the water, which in June, 1903, flowed over the plaintiffs' land, and caused the damage complained of. The defendants denied that they had been guilty of negligence, and contended that if any damage had been caused it was due to an act of God—viz., an abnormal and unprecedented flood. The trial occupied four days; this being the second occasion on which the case has been before the Court. At the last trial the Jury disagreed.*

Mr. MONTAGU LUSH, K.C., Mr. MONTAGU SHEARMAN, K.C., and Mr. LECK (instructed by Messrs. Mellor and Co.) appeared for the plaintiffs; Mr. LAWSON WALTON, K.C., Mr. DUKE, K.C., and Mr. SYLVAIN MAYER (instructed by Mr. J. S. Tyler) represented the defendants.

The Jury found that defendants had been guilty of negligence, and his Lordship entered judgment for the plaintiffs with costs (including the costs of the former trial); the amount of damage to be assessed by the Official Referee.

Contractor's Claim against the Stockport Corporation.

At the Manchester Assizes, on the 22nd ult., Mr. Justice Walton and a Jury were engaged in hearing a case in which Mr. A. Kellett sought to recover £12,155 from the Stockport Corporation for work done in connection with the construction of their reservoirs at Kinder. The plaintiff's tender, amounting to £248,000, was accepted; and it involved work extending over five years, at the rate of about £50,000 a year. The claim was in respect of a wing trench which went below the natural drainage level, and the construction of which was exceedingly difficult and expensive work, involving both excavation and pumping. It was work of an entirely different character from that done above the natural drainage level, and the plaintiff's contention was that it was outside the contract. It was not denied by the Corporation that the work was ordered; but it was submitted on their behalf that it came within the scope of the contract, by one clause of which the plaintiff undertook to do "all extra work." There was no question as to the quantity or the quality of that in question. At the close of the evidence and arguments, his Lordship decided that the plaintiff had failed to show that any work had been done except that which was within the contract, though no prices were quoted, and the working drawings did not show the particular trench. He said it seemed to him that the Engineer, finding the levels of the trench provided for in the plans were not sufficient, as at one time they were supposed to be, had added to them such a length that the other two trenches would meet over the full level of the dam. He had found the trench reasonable and necessary, and had ordered the change to be made and the work to be proceeded with. He (the learned Judge) came to the conclusion that there was no case to go to the Jury. The question as to what the plaintiff was to be paid would, by consent, be taken by himself. He added that he would reserve judgment upon points of law, but give leave to amend the pleadings with the view to a fresh trial. The Jury were then discharged.

* See "JOURNAL," Vol. LXXXIX., pp. 366-585.

Garden Hose Regulations at Hull.—On the suggestion of their Engineer (Mr. F. J. Bancroft), the Hull Water Committee have unanimously adopted the following resolution: "That any consumer requiring a garden supply be requested to enter into an agreement for the use of a hose-pipe, to be fitted with a rose, and held in the hand of the operator when in use; and that any consumer using water without, or contrary to, agreement, be reported to the Committee with the view to proceedings being taken."

Extensions at the Penzance Gas-Works.—The Penzance Gas Company, acting on the advice received from their Consulting Engineer, Mr. J. W. Buckley, Assoc.M.Inst.C.E., while he was Engineer of the Falmouth Gas Company, have decided to at once proceed with the reconstruction of their works. The new plant will include tar and liquor tanks and separator, a rotary washer-scrubber, a Pelouze and Audouin tar-extractor, exhausters, new boiler, &c., all capable of dealing with a daily make of 500,000 cubic feet. The contract for the whole of the plant has been placed in the hands of Messrs. Willey and Co., Limited, of London and Exeter. The Gas Company may be congratulated on the continued prosperity which renders necessary these important extensions, which, when completed, will bring the works into first-class condition.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills.

Bills reported: Bolton Corporation Bill, Heckmondwike Improvement Bill, Malvern Water Bill.

Bill read the third time and passed: Rhondda Urban District Council Bill.

HOUSE OF COMMONS.

The following further progress has been made with Bills.

Lords Bill read the first time and referred to the Examiners: South Barracas (Buenos Ayres) Gas Bill.

Lords Bill read a second time: South Barracas (Buenos Ayres) Gas Bill.

Lords Bill reported: Rhymney and Aber Valleys Gas and Water Bill.

Lords Bills read the third time and passed: Llandrindod Wells Urban District Council Bill, Matlock Bath Improvement Bill.

The Esk Valley Power-Gas Order Confirmation Bill was brought from the Lords last week, read the first time, considered and an amendment made, and set down for third reading.

THE ADMINISTRATIVE COUNTY OF LONDON AND DISTRICT ELECTRIC POWER BILL.

The Position of the Gaslight and Coke Company and the South Metropolitan Gas Company.

The proceedings of the Select Committee of the House of Commons presided over by Sir J. KITSON, to whom the Administrative County of London and District Electric Power Company's Bill was referred after its second reading in the Lower Chamber, have followed closely upon the lines of procedure adopted before the Lords' Committee; but a number of the petitions have now been withdrawn, and opposition against the measure dropped in their cases.

The petition of the Gaslight and Coke Company against the Bill was supported by Mr. BALFOUR BROWNE, K.C., and Mr. WILKINSON; and that of the South Metropolitan Company by Mr. BALFOUR BROWNE, K.C., Lord ROBERT CECIL, K.C., and Mr. ROSTRON.

Mr. J. D. FITZGERALD, for the promoters, alluding in his opening address to the petitions of the opponents of the Bill, referred to the position which two of the Gas Companies had taken up in the matter. The Gaslight and Coke Company said the result of the Bill would be to reduce the charges for electricity in London, and so increase the competition with them. This was possible. But when they were in the other House they called no witness at all, and practically took no part in the proceedings until absolutely at the very close. The generating station which they were proposing to erect at Fulham was on land which now belonged to the Gaslight and Coke Company. They were proposing to take the land compulsorily; and they were entitled to be heard against the proposal. He did not think they cross-examined about it at all; but at the end of the proceedings their Counsel addressed the Committee and said: "This is our land; it is a part of our undertaking, and the promoters have shown no reason for taking it—they have not shown that they could not get an equally good site somewhere else." Their Counsel said: "I was not bound to cross-examine." He was surprised at a Company like the Gaslight and Coke Company taking up such a position. Counsel produced the particulars of sale issued by the Company showing that the land was advertised for sale; and he asked them to put forward a witness in order that he might prove, by means of these particulars, that the land was actually in the market. They said they were not bound to put forward a witness, and that he had no right to say the land was for sale, although he had the particulars in his hand. After this, it was needless to say that their contention did not prevail. The opposition of the South Metropolitan Company was different. They had a large quantity of land adjoining the generating station in the borough of Greenwich which the promoters proposed to take; and under their deposited plans they sought power to acquire not merely the actual site of the proposed generating station—which was not on their land at all, but on the land of another company who were willing to sell it to them—but also an adjoining piece of land belonging to the South Metropolitan Gas Company, and intervening between the site of the proposed generating station and the South Eastern Railway Company. It was land which he believed was not now used by the South Metropolitan Company for manufacturing purposes; but it was land which they had no doubt acquired because they considered that as their business extended, it would come into use in future years. Of course, it was most desirable, almost essential, that the promoters of the Bill should have access to the South Eastern Railway Company. The South Metropolitan Company had power under one of their Acts to make a line of railway, or, to be more accurate, a siding from their works to the South Eastern Railway Company; and this siding would pass almost by the boundary of the land where they proposed to erect their generating station. The South Metropolitan Company said: "We object to sell any portion of our land—we want the land for our own purposes." Their answer was: "If you really are going to construct the siding, and will allow us to use it on arbitration terms"—that is to say, if they paid for the user—"and so give us connection with the South Eastern Railway, we don't want to take any of your land." Counsel put that to Sir George Livesey when he was in the witness box; and he certainly understood him to assent to it. He thought the exact expression he used was: "Well, no doubt it will come to that," or something of the sort. Accordingly he treated this rather as at an end. But when their Engineer tried to meet the Engineer of the South Metropolitan Company, he found it impossible to get a meeting at first, and afterwards he said that he had no instructions to agree a clause. The ultimate result was that they had to insist, so that they should not be shut off from the South Eastern Railway Company, that a clause should be inserted in the Bill giving the promoters power to take the land unless an arrangement of the sort was come to. This clause was now in the Bill; and he would be surprised if Sir George Livesey went into the witness box again and said that the clause inflicted any hardship at all on his Company.

The CHAIRMAN: Is this the only land intervening between you and the South Eastern Railway Company?

Mr. FITZGERALD: That is all.

In the course of the evidence of Mr. *C. H. Merz*, in support of the Bill, on July 19,

Mr. WILKINSON, on behalf of the Gaslight and Coke Company, said he had a few questions to ask with respect to a generating station, but not on the general principle of the Bill. He asked the witness if his Company sought to acquire land to erect three generating stations,

Witness said that was so. Two were on the east of their area of supply, and one to the west, at Fulham.

Mr. WILKINSON: The one I want to deal with is at Fulham.

Witness: Yes.

In the other House, the area which you sought to supply was considerably larger than the one which you propose to supply now, was it not?—Yes.

The proposed site which you wish to take from my Company is not now within the area which you seek to supply, is it?—No.

But when we were in the other House it was?—Yes.

By the Bill you seek powers to break up streets in Fulham with a view not of supplying Fulham—because you cannot supply there—but simply to get access to your station?—Yes.

As far as we supply in your industrial area you will come into competition with us for power?—Yes. Sir George Livesey said that he believed in competition; so I am sure you do, too.

The CHAIRMAN: What is your suggestion as to competition—that gas-power engines would be competed with by electric power?

Mr. WILKINSON: Yes; that is so. In fact, as Mr. Merz put it in the other House, he would hope to get some of our gas-engine consumers. (To witness:) Do you know anything at all about the restrictions which this land is or may be subject to with regard to the manufacture of gas?

Witness: No.

On July 20, in the course of his re-examination,

Mr. *Merz* was questioned by a Member of the Committee as to there being a great deal of competition against the promoters; and he was asked whether he thought that gas would compete against them. Witness said he thought their most serious competition would be small gas-engines.

You said yesterday that gas had displaced electricity?—They are improving small gas-engines every day. I think they will always be a competitor for power purposes.

Then I am not to take it that you mean that your scheme will not be a financial success if you do not get all the power, but merely that the public will not benefit?—That is so.

Mr. *S. Z. De Ferranti* was cross-examined on the same day by Lord ROBERT CECIL.

Lord R. CECIL: You have explained that in laying out the London stations you had in your mind the history of the Gas Companies?

Witness: Yes.

Now the Gas Companies' history was this: There were a large number of them supplying in competition in London; and they agreed among themselves to district London, and gradually one after another was absorbed by amalgamation, until we have it at present in the hands of three great Companies?—That is so.

When you came to design the County of London Company, you proposed to have a not very dissimilar scheme to this one?—It was very much the same in its general idea; only then the idea was lighting, and now it is power.

Surely it is both lighting and power?—To a very limited extent.

Your idea is a big one?—Yes. I wanted to get what the Gaslight and Coke Company have now. I did not get it. From that very moment the scheme was to a certain extent foredoomed to failure. The idea was practically in these days to get a very large electric business to correspond with a very large gas business.

Among the witnesses called on Monday, July 24, was Mr. *F. Dyer*, who described how the cost of electrical power in Shoreditch led him to use a gas-engine, with the result that the latter cost £90 as compared with £200 when electricity was employed as the motive power. A supply of electric current at ¾d. a unit, would, he said, save him a further £30.

Towards the conclusion of the promoters case, and before that for the opposing parties was entered upon, evidence was given by

Mr. *A. R. Stenning*, of Messrs. A. R. & F. Stenning, who stated, in cross-examination by Lord ROBERT CECIL, that he knew all the land scheduled at East Greenwich—39 acres—part of which belonged to Messrs. Redpath, Brown, and Co., and part of it to the South Metropolitan Gas Company. Some had been acquired under compulsory powers, and some by agreement. He thought about 18 acres was scheduled at West Ham. He did not know that at the East Greenwich site they had agreed not to take the portion of it that belonged to Messrs. Redpath, Brown, and Co.

Lord R. CECIL: Do you know they have stated that they did not require the land belonging to the Gas Company for the purposes of their generating station?

Witness: I do not know anything of the negotiations.

Can you bring steamers to it with coals?—You could not get a large steamer alongside. It would be necessary to make a jetty.

Witness went on to say that of the two sites, the West Ham and the Greenwich, he thought the latter was the better, because it was clearer land. There was a big works in the middle of the West Ham site, for

one thing, and the site did not, in his opinion, lend itself to large works so conveniently as the East Greenwich site.

Lord R. CECIL: We have been told you want only comparatively small buildings?

Witness: I understood the object was to make a large power station—the sub-stations to be smaller; but that it is essential to have a large power station.

In cross-examination by Mr. WILKINSON for the Gaslight and Coke Company, witness said he knew that the site at Fulham belonged to the Company. He did not know of any restriction with regard to the manufacture of gas relating to the land. The agent did not state any restrictions to him at the time it was offered.

Mr. J. D. FITZGERALD (in re-examination): Did I understand you rightly that, when you inquired about this land at Fulham belonging to the Gaslight and Coke Company, you were quoted a price for the freehold?

Witness: Yes.

Mr. Wilkinson has suggested in his cross-examination that the Gaslight and Coke Company are, by Act of Parliament, restricted as to the user of this land?—Yes.

If that is so, it makes it less valuable to them?—Undoubtedly there is a disability upon it.

Mr. *James Falconer*, one of the promoters of the Bill, was also cross-examined by Lord ROBERT CECIL upon his evidence.

Lord R. CECIL: By this Bill you propose to take from Messrs. Redpath, Brown, and Co. the land which the South Metropolitan Gas Company were not allowed to take in 1902; and you propose, in addition, to take a portion of the Gas Company's land.

Witness: Yes; that is so.

Do you think that is a proper proposal, in view of the fact that in 1902 Parliament said that the public interest required that the South Metropolitan Gas Company should have certain land?—I do not think Parliament said that at all. This land was purchased by the Company before they came to Parliament; and it was merely confirming the purchase. With regard to the land, I should like to add what had escaped me—namely, that the Gas Company expressly asked the Committee to put in a proviso that Messrs. Redpath, Brown, and Co. should not sell the land without first offering it to them; and the Committee refused to insert any such proviso.

In addition to taking the land, you have put in powers to take a wayleave underneath it?—Yes. We do not require that. It is a wayleave for mains; that has nothing to do with the railway access.

The Bill is still under consideration.

GAS COMPANIES AND ELECTRIC LIGHTING ORDERS.

THE SURBITON ORDER.

Last Thursday the Select Committee of the House of Lords, of which the EARL OF KINTORE is Chairman, considered a Bill to confirm a number of Electric Lighting Provisional Orders, the only opposed one being that relating to Surbiton.

Mr. WEDDERBURN, K.C., appeared for the promoters, the Surbiton Urban District Council; the petitioners in opposition (the Kingston Gas Company) being represented by Mr. C. C. HUTCHINSON.

Mr. WEDDERBURN, in opening, mentioned the arrangement under which electricity was supplied in Surbiton. The Local Authority obtained their Order in 1901. They provided a site and generating station, and made arrangements with Callender's Cable and Construction Company, by which the latter were to supply electricity, making what profit they could, and paying, as rent, a sum sufficient to enable the Council to meet sinking fund and interest charges. In 1894, and again in 1895, the jurisdiction of the Local Authority was extended; the result being that the area in which the Surbiton Urban District Council (as the Local Authority now was) were authorized to supply was not so large as their area for local government. It was desirable that the two areas should be coterminous; and the present Order was promoted to secure this. The object of the petitioners was to obtain the insertion of the Bermondsey or Northumberland clause. It could hardly be inserted in the present Bill, because it could only operate against a local authority. As long as the agreement was in force, it could not be applied. The question therefore was whether it should be put in, to operate at such time as the Council might determine the agreement. Counsel submitted that to do so would be legislating too far ahead; and it might have the effect of causing the Council to decide not to take over the undertaking (because of the difficulty of working under the clause) when otherwise they would do so. He quoted several precedents, among them being that of the Gravesend Corporation, in which Mr. Hutchinson asked the Committee to reject the Order or insert the clause. In that instance, Gravesend sought to supply not only their own district, but the adjoining area of Northfleet; and, moreover, they had had a rather tiresome lawsuit which cost some thousands of pounds. No mismanagement, however, was shown; and the Committee therefore sanctioned the Order and refused the clause.

Mr. *F. J. Bell*, the Deputy and Acting Clerk to the Surbiton Urban District Council, gave formal evidence in support of the Order.

In cross-examination, he said the Gas Company were rated at about £2400, and the general district rate was 3s. 5d. in the pound, so that the Company contributed about £400 a year to the rates. If the Local Authority took over the undertaking, and a few years later had to replace the plant, the expense would not come out of the rates. He thought the Local Government Board would sanction a loan for the purpose. The electric undertaking undoubtedly competed with the Gas Company. He admitted that the accounts had not been prepared at the date prescribed by the Electric Lighting Acts but an extension of time had been obtained from the Board of Trade.

Mr. HUTCHINSON, on behalf of the petitioners, argued that Parliament had never said that special circumstances must be shown before the clause could be inserted. On the contrary, in the Beckenham and other cases Parliament had said special circumstances must be shown before it would be excluded. He cited a number of precedents in support of his claim that the clause should be allowed. In the case of the Hampton Wick Order (which was granted to a Company, and not, as here, to a Local Authority), he pointed out that the Northumberland clause was inserted to become operative when, in 35 years' time, the Local Authority acquired the concern. In the present session, the clause had been asked for and inserted in no fewer than 15 cases; the practice of the Board of Trade where the clause was asked for appearing to be to cast on the promoters the obligation to show cause why it should not be adopted. Unless such cause was shown, it was inserted as a matter of course. The promoters had proved the case for the petitioners, because they had failed to comply with the Electric Lighting Acts in the matter of accounts, and because they already suffered loss inasmuch as their Contractors merely defrayed interest and sinking fund charges, and paid nothing for management and establishment outlay, which had to be met by the promoting Council. Besides this, there was no authority for the action of the Contractors in supplying outside the district.

The CHAIRMAN: We think the Bill, in all the circumstances, should proceed without the proposed clause being inserted.

Mr. HUTCHINSON asked whether the decision went to the point as to the clause becoming operative when the undertaking passed into the hands of the Local Authority.

The CHAIRMAN said a majority of the Committee were against him on that.

The Bill was accordingly ordered to be reported for third reading.

POLICE AND SANITARY COMMITTEE.

The Work of the Session—The Standardization of Clauses.

The Select Committee to whom were referred all Private Bills promoted by municipal and other authorities by which it is proposed to create powers relating to police or sanitary regulations in conflict with, deviation from, or excess of, the provisions of the general law, have made a special report on the results of their labours. The Committee first met on the 8th of March; and they sat on 28 days. In addition, the two sections of the Committee when divided each sat on 10 days. Seventeen Bills originating in the House of Commons and nine originating in the House of Lords were considered, of which nine Commons Bills and all the Lords Bills were dealt with by the whole Committee, and four Commons Bills by each of the sections. Under the power given by the House, the Committee referred three Bills to the Committee of Selection, in respect of certain clauses. By the exercise of this power, and by sitting as two Committees when circumstances permitted, they got through the work with greater ease and speed than they had done for some years. Without this relief, it was doubtful if they could have completed the Bills within the limits of the session.

The Committee again emphasize the desirability of their being enabled to commence their work as early as possible in the session; and while they recognize the support they have received from the earlier preparation of the reports of the Government Departments, the fact remains that on several occasions they were obliged to adjourn for these reports. They are hopeful, however, that the more strict insistence on a uniform clause for the respective new powers allowed, which has been again followed, and which has largely simplified their labours, may also tend to reduce the necessary work of the Departments in preparing their reports. Besides this, the Committee have this year required tabular statements to be presented to them with each Bill, setting forth the statutory compliances with the Borough Funds Act, furnishing particulars of area, population, rateable value, rates, &c., and making a full statement of the existing loans, sinking funds, and undertakings of the corporation or council. This, besides enabling the Committee more readily to realize local circumstances, has, they believe, saved much time and consequent expense. It probably also has a useful effect in causing local authorities themselves to appreciate their financial position.

The Committee found the promoters and Parliamentary Agents of the Bills ready generally to adopt their suggestions, which, like the standardization of clauses, will tend to simplify drafting work in the future. In connection with this subject, they think that some such codification might be usefully extended to the form in which estimates for various works are produced, not only in Bills for their consideration, but in all Bills promoted by local authorities. This object would, they say, be effected if the form of estimate deposited by the promoters were framed with sufficient detail to enable the Committee on the Bill to satisfy themselves as to the expenditure involved, and as to the probable life of the respective works for which the periods of loans have to be determined.

The Committee then deal with some of the points in certain of the Bills submitted to them, on which from time to time they have reported to Parliament, and conclude by recording their appreciation of the services rendered by the representatives of the Local Government Board and the Home Office (Messrs. Boyce and Delevingne), and by Mr. Bramwell, the Clerk to the Committee.

Extension of High-Pressure Gas Lighting in the City.—The James Keith and Blackman Company, Limited, have received a further order from the City Corporation to proceed with the work of putting up a complete high-pressure gas installation for Lower Thames Street and Monument Street. This order completes the Corporation's present schemes for displacing electric light by high-pressure gas. This particular installation is not so large as that for Queen Victoria Street; but it is equally important, owing to the great amount of traffic that goes on in these streets for the Billingsgate Fish Market during lighting hours. The installation will consist of 31 300-candle power lamps, arranged on columns and brackets, and two 900-candle power lamps on columns. The compressing plant will be duplicated, consisting of two No. 3 Keith's compressors, water-driven, of "enclosed" pattern.

MISCELLANEOUS NEWS.

THE BENEFICIAL RESULTS OF CO-PARTNERSHIP.

The Scheme of the South Metropolitan and South Suburban Gas Companies.

The Crystal Palace was last Thursday the scene of what has come to be a most interesting function—the co-partnership gathering of the South Metropolitan and South Suburban Gas Companies. About mid-day, numbers of smart-looking men, accompanied by their wives, began to assemble; and an inquirer would have learned that they consisted of foremen and other employees of the Companies named, and that each one was a capitalist and a man with a good record of work behind him. No wonder Sir George Livesey, the Chairman of the Companies, is proud of his men—and that he is so was abundantly clear to those present at the festival—and derives manifest pleasure from meeting them. Of the four hundred or so men and women who were present, not one of the former is the possessor of less than £25 of stock in the Company for whom he works; while a no less important stipulation is that they must have been not less than ten years in the Company's service. It must not be taken that the number named exhausted those eligible—far from it; for the privilege of attending had to be decided by lot. Thrice happy were those who were lucky enough to be present—happy to have accomplished a term of service proving them to be good workers, happy to be partakers in a scheme which can bring them benefits such as have hitherto been beyond the reach of men in their path of life, and happy to participate in the hospitality of the Directors of the Companies which marks these gatherings. The co-partnership festivals are to those fortunate enough to be present "Red-letter" days—or perhaps it would be even truer to say that the occasions are written in letters of gold, seeing that the interest of the men and officers in the scheme is represented by figures which run on towards £300,000. This huge sum has been freely set aside for the benefit of the employees; and—as is stated in the Companies' reports published in another part of to-day's issue—co-partnership has amply justified itself as a commercial proposition. Indeed, the dominant—in fact, the only—note at last Thursday's proceedings was "Success."

At one o'clock the large party sat down to an excellent dinner, to which full justice was done. Sir George Livesey was in the chair—but for a large part of the time only figuratively speaking, for his lively interest in the men and their affairs was manifested by the kindly way in which he went round the long tables speaking first to one and then to another. He was supported by Mr. John Mews, Mr. John Ewart, and the three Employee Directors (Messrs. Austin, Butcher, and Drumgold) representing the South Metropolitan Gas Company; but unfortunately Mr. Robert Morton did not feel strong enough to attend. Mr. Frank Bush, the Secretary, was also present; but the Chief Engineer, Mr. Charles Carpenter, was detained in London on business. The South Suburban Board were not so well represented, as Sir George himself was the only Director able to be present. Mr. Charles Hunt was unhappily kept away by illness, and Sir Fortescue Flannery, M.P., by his parliamentary duties. The officers, however, were represented by the Engineer (Mr. S. Y. Shoubridge) and the Secretary (Mr. Charles M. Ohren). At the conclusion of the dinner, some interesting speeches were made; and in this connection we cannot refrain from complimenting the workmen on their choice of spokesmen. Not one merely, but all of the speeches delivered by the employees were marked by eloquence and depth of thought; and the wisdom displayed by the men in selecting comrades to represent their views—both at the Board and on occasions like the present—goes far to justify the great faith the Company repose in them.

The Loyal Toast having been duly honoured, Sir George Livesey proposed "Prosperity to the South Metropolitan and South Suburban Gas Companies and to the Co-Partnership Movement." He said he once thought this word "co-partnership" was rather a new thing; but he had looked in several dictionaries and found it in all of them. In the oldest—that by Walker, who died a hundred years ago—he found what he regarded as the best interpretation, for it gave the meaning of co-partner as "equal partner." He hoped they were all equal partners except in one impossible respect. They could not all be equal in the matter of their shares in the Companies; but they were all equal in most other particulars—he hoped in their desire to promote the welfare of the Companies and the co-partnership movement. He was bound to say that, so far as the Directors of both Companies were concerned, they had done all they could to promote the success of the scheme. The success of the two Companies was bound up very largely with the success of the co-partnership movement; if it was not a success, the undertakings would not be so prosperous as they were now. They might believe him—and he was speaking to the men and to their wives—that the success of the scheme depended upon them. The Directors and officers could do no more than they had done; and it was for the men to rise to the importance of the movement. Some said that it was not an important movement, but a wrong movement—they did not believe in people becoming owners of property, but that all property should belong to the State. The great Italian Mazzini said that ownership of property was as old as mankind on the earth—it always had been, and he proclaimed that it always would be to the very last. In regard to the co-partnership movement, the object of it was to make all classes property owners. The great difference between the upper and middle classes and the lower classes, as they were called—though they were not lower in any sense except they were poorer—was that the two former were owners of property while the working classes were not. He and his fellow Directors believed that if all could be owners of property it would be beneficial to the whole country; and what they hoped to see was that their people there would, in their early working days, become the possessors of sufficient property to enable them to spend the closing years of their lives in peace and comfort, as some were already doing. In consequence of the co-partnership movement, some of the men had been able to purchase their houses; and on the arrival of the age for retiring went into the country, where they were living, with sufficient income from the superannuation fund and their savings to pass the evening of life in comfort. He did not believe in people working all their days, or playing all their days either. Work and play in proper proportions was the right thing; and if their people would work and save and do their best in the early days, they might be able to spend their closing days in comfort. The Directors wanted the co-operation of all in this great movement. They believed that it would solve the difficulty between Capital and Labour, and if the principle were adopted generally, all troubles and disputes, of any serious kind at any rate, would disappear, as they had disappeared in the case of these two Companies. So far as he could learn—and he did not think he was misled—there was with them no possibility of a disagreement between employers and employed. They employed themselves; and how men could strike or fight against themselves, he did not know. It depended upon the men, as he had said, whether co-partnership was to be a continued success or not. If they were indifferent, it would drop; but if they believed it was a right principle, it remained with them to make it a permanent success. Looking at the matter in another light, the movement was not merely for themselves. They wanted to raise the whole labouring class of this country to a better position. What was done in the case of these two Companies was known over all the land; and if the plan failed with them, it would be a permanent set-back to a great movement. If, however, it succeeded, he had no doubt that in time the example would be followed by others; and it might be the means of helping towards the establishment of a new life in the industrial world, and the lifting of the labouring classes to a higher condition—thus improving the whole status of the country. If it improved the position of people, if it made them think (for this, after all, was one of the principal things), if it raised their self-respect—it would tend to help them towards all that was good, and tend also to put aside everything that might be detrimental to their welfare here or hereafter. He concluded by wishing prosperity—and asking their active co-operation in promoting this prosperity—to the co-partnership movement in connection with the two Companies.

The next speaker was Mr. John Mews, a member of the South Metropolitan Board, who remarked that it afforded him great pleasure to be present on these occasions, because they gave him an opportunity of judging for himself whether the system of co-partnership was a success or a failure. In this great scheme, there should be mutual confidence; this was the way that Capital and Labour would work together properly, as they should do. Employers and employed could not have this mutual confidence unless they saw one another; and this was one of the great benefits of these annual gatherings—they afforded an opportunity of seeing each other's faces, and what was in each other's minds. He had attended all the dinners they had had there, and had carefully watched the faces; and he had not the slightest doubt that there was a true ring in the men's hearts, which harmonized with the ring that came from the Directors' hearts to them. He wished them prosperity, because he was quite sure prosperity to them meant prosperity to the South Metropolitan Gas Company. His reason for saying this was that each one of the men there was first of all a workman, secondly a shareholder, and thirdly (he expected) a consumer; so that if they did not do their work well they would not get a bonus, and would have to pay a higher price for their gas. This co-partnership principle seemed to be the true solution of the labour questions which cropped up. If all England could carry on its trade in the way these Companies were doing, nothing would be heard about Protection, Retaliation, or Free Trade—all these things would have gone by the board. They must endeavour, as far as they could, to point out to the country that the co-partnership principle was one which they, as Englishmen, ought all to strive for.

An enthusiastic vote of thanks was accorded to the Directors for their hospitality, and for the many other kindnesses shown by them to the men. Mr. Manley, a member of the Co-Partnership Committee, who proposed the resolution, said the scheme increased the self-respect of the men, and had given them a higher standard which they were trying to live up to. It had also enriched those in the South Metropolitan Company by over £250,000, it had brought about a feeling of good fellowship between the men and the officers of the Company, and it had given the employees confidence in the Directors. Then, again, it had given them peace. There were never any disagreements; and nearly all tried to do their best—those who did not being made to by their fellow workmen. Really, one man now looked after another. He also desired to express the gratitude of the men to the officers for their courtesy, and in this connection made special mention of Mr. Bush, Mr. Carpenter, and Mr. Sims. The seconder—Mr. Hall—remarked that they were thankful for the kindly words of advice so often given by Sir George Livesey; and he trusted all co-partners would profit by them.

The vote was responded to by Mr. John Ewart, who said he was a Director of the Company when co-partnership—or, as it was called at that time, profit-sharing—was first proposed. The Board gave the matter a great deal of consideration; for though the Chairman had told them that the idea was more than a hundred years old, it had not until then been tried on a very large scale. They all had confidence in the plan; but it had succeeded beyond the anticipations of any of them. It must be a satisfaction to all the men to know that they had a stake in the South Metropolitan Company of more than £250,000, and to feel that when they were laid by—when they had done with work, and came to receive their pension—they had the interest to fall back upon, and that when their time came to leave this world their widows and children would have the money to draw upon. There was also another phase of co-partnership to which he was at first much opposed—the election of Workmen Directors. Theoretically, there was very possibly little to be said against it; but it had never been tried, at any rate on a large scale, and he did not think it could succeed. He was glad to say that, owing to the admirable wisdom which the co-partners had displayed in their choice of Directors, experience had shown his fears to be groundless. These Directors had devoted themselves to the best interests of the Company from every point of view. There was one other matter he should like to allude to, and that was the satisfaction they felt at seeing the Chairman among them in such excellent health and spirits. (Loud applause.) This time last year, when he addressed

the men, he was, though very few of them knew it, in great pain and suffering. A short time after he was, as they were aware, laid up for many weeks; but owing to the skill of the surgeons, through his own splendid constitution, and by the mercy of God, he had been spared to them, and was, he believed, stronger now than for years past.

At this stage of the proceedings, Sir George Livesey took the seat at the head of the South Suburban Gas Company's table; remarking that it was unfortunate he was the only Director able to be present. Sir Fortescue Flannery had, however, written him a letter, in the course of which he explained that nothing less than urgent parliamentary duty would have kept him away from the dinner, and said: "As time goes on, and I obtain further experience of the co-partnership system as carried out at the South Suburban Gas-Works, and as set forth and legislated upon by Parliament in connection with that Company, the more is my faith in the system confirmed—not merely as a method of promoting prosperity in our Company and its workers, but as the one great connecting link between employer and employed, gradually, and without injustice to anyone, bringing them closer, so that in process of time their absolute identity is established and consolidated. I hope that you will live for many years yet to promote the cause of co-operation; and that I may also be spared to take, with you, my humble share in a work which helps to solve one of the great problems of the time, and to elevate and improve the conditions of life of many of our most deserving citizens and their families." Sir Fortescue Flannery was a man of large experience; and his testimony was very valuable. Nothing he (Sir George) could say would be so good as the letter he had just read, because it came from a man who was quite independent, and who had joined the Board only a few years ago. The South Suburban Company's workers were quite on a par with those of the South Metropolitan Company in their appreciation of the co-partnership movement. In fact, he was not quite sure whether they had not made better use of their time; for they had only had the scheme since 1893—the first bonus was paid in 1894—and they had as large a proportion per man on the average as in the case of the other Company. He thought the amount was about £25,000; and practically the whole of the bonus was saved. So far as the South Suburban Company were concerned, he must mention three men as particularly worthy of credit for the success that had been achieved—Mr. Ohren, Mr. Shoubridge, and Mr. Jones, the Co-Partnership Secretary. He hoped that the workers would respond in the future as they had done in the past. It was a great satisfaction to the Directors to find that wives were joining their husbands in appreciation of the movement; and they were pleased to see that in many cases the stock was held in the joint names of husband and wife. This was as it should be.

Mr. S. Y. Shoubridge, the Engineer of the Company, in thanking Sir George and the Directors for their hospitality, assured them that the great things they had done in instituting the co-partnership system were heartily appreciated. He thought the best proof of this was the fact that the whole of the bonus this year had been left intact—not a penny of it had been withdrawn. And in addition to this, a large sum had been left in contributions by the men out of their wages. This showed that the spirit of co-partnership animated them, and that they were becoming more and more thrifty. All at Lower Sydenham were actuated by one desire—to promote the success of the Company, and to show that they thoroughly appreciated the noble efforts that had been made on their behalf.

Mr. Frank Law and Mr. Tanner contrasted old-time conditions with those prevailing at the present day. In the course of his remarks, the latter gentleman (who was for many years Foreman at the Old Kent Road works) said he remembered the time when there were eight gas holders on the works. Seven of them, which contained 5¼ million cubic feet, cost £96,000; and then, by the thought and labour of Sir George Livesey, one was erected which held just about the same quantity of gas and cost £42,000.

The proceedings were brought to a close by an interesting speech by Mr. Frank Bush, the Secretary of the South Metropolitan Company, who said that the names of Mr. Carpenter, Mr. Sims, and himself had been joined together; but allied to them were many other earnest gentlemen who were all, he felt quite sure, endeavouring to do their best to carry the co-partnership system through. Sixteen years ago the foundation stone of this great edifice was laid by Sir George Livesey; and it must be pleasant to him to see it rise year by year. This year £42,000 was added; and there was every probability that next year's "stone" would be of similar weight. As had been stated, the total amount held by officers and workmen of all grades was upwards of £250,000; and he wished them to get into their minds—though not as the ultimate goal—the figure of £500,000. As to the individual amounts held by workmen, there were, he was glad to say, very few holding £5, though among the young and new hands there must necessarily be some. He was, however, sorry to see there were so many holding £10 and £15. There were 470 workmen holding £20; 192, £25; 310, £30; 115, £35; 126, £40; 47, £45; 70, £50; 21, £55; 47, £60; 26, £65; 34, £70; and so on. There were 169 who held £100 and upwards – many of them £200, £300, and £400.

Enjoyable as the dinner proved to be, it was only one item in a day given up to pleasure. Later on the party assembled for tea; and afterwards full advantage was taken of the various attractions afforded by the Crystal Palace.

The Suffocation by Gas at Lichfield.—The circumstances attending the death of Lieut.-Col. O. B. Feilden, late of the Seaforth Highlanders, as recorded last week (p. 268), were investigated at Lichfield on the 24th ult. by Mr. S. W. Morgan, the Deputy District Coroner. Dr. Tomkys stated that death was due to asphyxia, and added that if Mrs. Feilden had remained in bed she also would have been suffocated by the rising gas. The fumes would have less effect upon her on the floor than in bed. She was still in a very serious condition. He had attended the Colonel for heart disease, and the gas fumes would, he considered, have a deadly effect upon him. The Jury returned a verdict of "Accidental death," and expressed their sympathy with the widow and family.

THE GASLIGHT AND COKE COMPANY'S ACCOUNTS.

[For the Half-Yearly Report, see p. 304.]

The accounts of the Company consist of the usual statements, from which we take the following particulars.

The statement of capital (stock) sets forth that the total paid up is £9,466,500; added on conversion, £12,176,565—total amount authorized, £21,643,065. The statement of loan capital stands thus: Total paid up, £2,844,000; added on conversion, £1,479,975; unissued, £750,000—total amount authorized, £5,073,975.

The capital account shows receipts (with premiums, £1,586,807) to the amount of £27,533,882 11s. 9d. (£19,965 redeemed in the half year). The expenditure is shown in the following items:—

Expenditure to Dec. 31, 1904			£13,267,045 14 6
Expenditure during the half year to June 30, 1905—viz.,			
Land	£553 2 8		
New and additional mains and service-pipes	17,228 18 6		
Do. do. meters	25,176 15 1		
Do. do. stoves	14,637 18 0		
	£57,596 14 3		
Sale and depreciation of plant	6,832 0 1		
		50,764 14 2	
Total expenditure			£13,317,810 8 8
Nominal amount added on conversion			13,656,540 0 0
			£26,974,350 8 8
Deduct amount of capital redeemed under Company's Act of 1903			19,965 0 0
			£26,954,385 8 8
Balance of capital account			579,497 3 1
			£27,533,882 11 9

The following is the revenue account:—

Expenditure.

June Half Year, 1904.		£ s. d.	£ s. d.
	Manufacture of Gas—		
£648,200	Coal and oil into store	611,890 12 4	
15,757	Salaries of Engineers and other officers	14,547 1 8	
124,652	Wages, gas making £116,213 6s. 5d.	133,050 6 1	
17,239	,, sundries £16,836 19s. 8d.		
53,593	Purification, including £18,973 10s. 8d. for labour	47,015 16 9	
164,867	Repair and maintenance of works and plant, materials and labour, less received for old materials, £7131 5s. 11d.	170,806 4 5	
	Distribution of Gas—		977,310 1 3
38,511	Salaries and wages of officers (including Rental Clerks)	41,102 19 2	
63,769	Repair and maintenance of mains and service-pipes	56,011 18 6	
27,968	Repair and renewal of meters	28,811 18 5	
33,927	Repair and renewal of stoves	36,896 3 10	
			162,822 19 11
16,796	Public lamps—Lighting and repairing	..	19,334 12 3
	Rents, rates, and taxes—		
5,901	Rents payable	5,812 18 1	
142,636	Rates and taxes	146,855 8 2	
	Management—		152,668 6 3
2,750	Directors' allowance	2,750 0 0	
217	Company's Auditors and Assistant	212 12 0	
7,074	Salaries of General Manager, Secretary, Accountant, and clerks	7,843 17 0	
24,040	Collectors and Cashiers	24,302 18 6	
7,658	Stationery and printing	7,633 7 11	
3,068	General charges	3,453 11 6	
			46,196 6 11
380	Parliamentary charges	..	3,300 0 0
1,553	Law charges	..	1,727 13 5
..	Charges *re* quinquennial re-valuation	..	1,527 2 4
4,497	Bad debts	..	6,323 2 0
500	Depreciation fund for Works on Leasehold Lands	..	500 0 0
18,384	Annuities, including contribution to officers' superannuation fund	..	22,461 0 9
717	Workmen's compensation account	..	1,035 0 2
	Public officers—		
1,253	Gas Referees and Official Auditor	1,251 8 11	
681	Public testing-stations	689 8 4	
			1,940 17
£1,425,588			1,396,547 12 6
638,871	Balance carried to net revenue account		509,223 9 4
£2,064,459			1,905,771 1 10

Receipts.

June Half Year, 1904.		£ s. d.	£ s. d.
	Sale of gas—		
£1,494,522	Per meter, at 2s. 11d. and 2s. 2d. per 1000 cubic feet	1,424,844 4 8	
69,048	Public lighting and under contracts	67,901 5 5	
£1,563,570			1,492,745 10 1
32,229	Rental of stoves	..	31,669 2 0
	Residual products—		
£288,840	Coke, less £40,566 9s. 8d. for labour, &c.	216,013 8 0	
13,951	Breeze, less £3146 2s. 11d. for ditto	14,428 10 5	
65,041	Tar and tar products	48,631 17 3	
96,134	Ammoniacal liquor and sulphate of ammonia	94,321 12 2	
£463,966			373,395 7 10
£4,411	Rents receivable		4,620 6 11
283	Transfer fees		340 15 0
£2,064,459			1,905,771 1 10

The balance available to the redemption fund and to dividend on the

ordinary stock is £562,319; and the statement showing how it is proposed to appropriate it is as follows:—

June, 1904.			
£175,417	Net balance brought from last account		£248,192 12 0
443,909	Net revenue for the half year		314,126 15 11
£619,326			£562,319 7 11
10,000	Less contribution to redemption fund		10,000 0 0
(£4 8s. per cent.)	,, dividend on the ordinary stock—		
£335,350	£4 8s. per cent. per annum on £15,223,235		334,911 3 5
£273,976	Balance carried to next account		£217,408 4 6

The three statements relating to the reserve, insurance, and depreciation funds show that the balances on June 30 were as follows: Reserve fund, £59,739 4s. 7d.; insurance fund, £95,371 7s. 2d.; and depreciation fund, £59,075 13s. The insurance fund had to bear in the past half year a sum of £94 17s. 2d., the value of plant destroyed by fires in the Company's district, and £8000 in respect of the Southampton Row explosion.

The following statements relate to the working:—

Statement of Coals Used, &c.

Description of Coal.	In Store Dec. 31, 1904.	Received During Half Year.	Carbonized During Half Year.	Used During Half Year.	In Store June 30, 1905.
	Tons.	Tons.	Tons.	Tons.	Tons.
Common	249,248	765,551	845,889	2,446	166,464
Cannel	14,732	..	*1,152	..	13,580
Total	263,980	765,551	847,041	2,446	180,044

* In addition to this quantity of cannel, 7,928,071 gallons of oil and spirit were used during the half year.

Statement of Residual Products.

Description.	In Store Dec. 31, 1904.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store June 30, 1905.
Coke—tons	41,617	530,978	115,766	419,548	37,281
Breeze—tons	5,881	94,375	13,337	82,457	4,462
Tar—gallons	937,938	8,586,964	8,869,231	19,057	636,614
Ammoniacal liquor—butts	19,104	241,276	244,619	..	15,761

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Total Quantity Accounted for.	Number of Public Lamps.
	Public Lights and Under Contracts. (Estimated.)	Private Lights (per Meter).		
Thousands.	Thousands.	Thousands.	Thousands.	
*11,283,976	463,121	9,987,774	10,586,687	49,695
†11,297,719	466,502	10,174,981	10,788,274	49,004

* Including 2,659,442,000 cubic feet of "oil gas." † June half year, 1904.

The remaining statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, £119,787; oil and petroleum spirit, £43,806; coke, £17,686; tar and ammoniacal liquor and products, £67,493; and sundries, £243,712. The figures this time last year were: Coal, £117,878; oil and petroleum spirit, £53,822; coke, £26,259; tar and ammoniacal liquor and products, £101,859; and sundries, £242,554.

BRENTFORD GAS COMPANY.

Half-Yearly Report and Accounts.

In the report of the Directors of this Company to be presented at the ordinary general meeting next Friday, they state that there was an increase of 5·17 per cent. in the sale of gas in the six months ending the 30th of June, compared with the corresponding period of last year, notwithstanding that trade depression, the mildness of the winter, and the extended use of incandescent burners must to some extent have adversely affected the consumption of gas. It is gratifying to find that the number of consumers continues to increase. Unfortunately, the state of the coke and tar markets has been such as to have caused a considerable decrease in the receipts for residual products.

The accounts accompanying the report show that the revenue from the sale of gas was £153,366, against £151,209 in the first half of 1904; and meter-rents produced £15,254, compared with £13,033. Residual products, however, yielded only £29,594, against £34,588—a drop of £4994. The total receipts were £198,255, and the expenditure was £153,997; leaving £44,258 to go to the net revenue account, against £47,270 carried to that account this time last year. The amount available for distribution is £98,254; and the Directors recommend dividends at the rates of 5, 12½, and 9⅜ per cent. per annum on the preference, consolidated, and new stocks respectively. The working statements show that 74,270 tons of Newcastle coal, and "Solar" oil equivalent to 32,531 tons were used in the half year in the production of 1,165,324,000 cubic feet of gas, of which 1,099,490,000 cubic feet were sold and 1,114,490,000 cubic feet accounted for. The estimated quantities of residuals were: Coke, 46,504 tons; breeze, 5793 tons; tar, 803,294 gallons; and ammoniacal liquor, 19,846 butts.

THE SOUTH METROPOLITAN GAS COMPANY'S ACCOUNTS.

[For the Half-Yearly Report, see p. 304.]

The following are the principal portions of the accounts of the above-named Company for the six months ending the 30th of June, which, with the Directors' report, will be presented at the ordinary genera meeting on the 9th inst.:—

The first two statements relate, as usual, to the stock and loan capital. The former sets forth that the standard rate of 4 per cent. is payable on £6,011,224 and £238,776 (Act of 1901) of stock; while the latter shows that the loan capital, the rate of interest on which is 3 per cent., amounts to £1,798,994 and £96,451 (Act of 1901). The third statement is the capital account. It stands as follows: Amount received, £5,096,554; nominal amount added by conversion (less premium), £3,048,891—total, £8,145,445. The items of expenditure are as follows:—

Capital account to Dec. 31, 1904		£4,776,383 17 11
Expenditure during half year to June 30, 1905, viz.—		
New buildings and machinery in extension of works	£14,853 1 11	
New and additional mains and services	12,737 7 0	
New and additional meters	15,091 18 7	
New and additional stoves	6,101 19 10	
	48,784 7 4	
Total expenditure		£4,825,168 5 3
Balance		271,385 14 9
		£5,096,554 0 0
Nominal amount added by conversion, less premium		3,048,891 0 0
Total		£8,145,445 0 0

The following is the revenue account:—

Expenditure.

Manufacture of gas—		
Coal into store, including £26,680 16s. 9d. for labour	£322,338 10 1	
Purification, including £7849 16s. 9d. for labour	21,132 18 3	
Salaries of Engineer and Officers at works	12,463 2 3	
Wages (carbonizing)	58,863 11 4	
Repairs and maintenance of works and plant, including £49,599 13s. 9d. for labour, less £4956 5s. 8d. received for old materials	96,612 10 5	
		£511,410 12 4
Co-partnership for twelve months to June 30	42,091 19 9	
Less on account	18,000 0 0	
		24,091 19 9
Distribution of gas—		
Repair, maintenance, and renewal of mains and service-pipes, including £23,784 9s. 8d. for labour	£31,419 4 10	
Salaries and wages of officers, including Rental Clerks	16,496 18 3	
Repairing and renewals of meters, including £4382 4s. 2d. for labour	21,839 4 1	
Repairing and renewals of stoves, including £9694 8s. 5d. for labour	18,637 12 4	
Gas-fittings (labour)	6,568 11 2	
		94,961 10 8
Public lamps, including £10,524 6s. 8d. for labour, and £7102 7s. 10d. for materials, less £14,963 18s. 6d. received for maintenance		1,372 12 4
Rents, rates, and taxes—		
Rents payable	£941 12 3	
Rates and taxes	40,963 17 2	
		41,905 9 5
Management—		
Directors' allowance	£2,508 16 6	
Salaries of Secretary, Accountant, and Clerks	3,602 12 4	
Collectors { Ordinary	5,736 13 11	
Collectors { Slot meter	6,810 15 10	
Stationery and printing	2,744 8 4	
General charges	7,556 17 11	
Company's Auditors	112 10 0	
		29,072 14 10
Law charges	£531 17 9	
Parliamentary charges	3,300 0 0	
		3,831 17 9
Bad debts		1,648 9 5
Pensions and officers' and workmen's superannuation, sick, and accident funds		6,718 4 11
Gas Referees and Official Auditor		245 17 7
Leasehold renewal fund		300 0 0
Total expenditure		£715,559 9 0
Balance carried to net revenue account		196,560 14 3
		£912,120 3 3

Receipts.

Sale of gas—		
Lady Day, at 2s. per 1000 feet	£345,643 7 3	
Midsummer, at 2s. per 1000 feet	242,027 14 6	
	£587,671 1 9	
Public lighting	14,896 10 7	
		£602,567 12 4
Meters in use (293,768)—		
Company's meters at rent: Ordinary, 102,675; slot, 182,073	£31,741 0 10	
Company's stoves at rent: Ordinary, 68,638; slot, 156,540; fires, 18,385	25,750 9 2	
		57,491 10 0
Residual products—		
Coke, less £1279 14s. 1d. for cartage; £15,576 17s. 7d. for labour, &c.	£144,687 16 1	
Breeze, less £428 0s. 8d. for cartage; £2516 13s. 3d. for labour, &c.	7,495 16 5	
Tar and tar products	36,345 1 0	
Sulphate of ammonia	61,801 6 11	
		250,330 0 5
Rents receivable		1,637 18 0
Transfer fees		93 2 6
Total receipts		£912,120 3 3

The net revenue account shows a sum of £194,174 18s. 10d. applicable to dividend on the ordinary stock. Following this are the statements relating to the reserve, renewal, and insurance funds. They show that the balances on the 30th of June last were as follows: Reserve fund, £171,881; renewal fund, £23,456; insurance fund, £103 748.

The statements furnishing manufacturing details are as follows:—

Statement of Coal.

In Store Dec. 31, 1904.	Received During Half Year.	Carbonized During Half Year.	Used During Half Year.	In Store June 30, 1905.
Tons. 111,057	Tons. 531,972	Tons. 584,623	Tons. 843	Tons. 57,563

Statement of Residual Products.

Description.	In Store Dec. 31, 1904.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store June 30, 1905.
Coke—cwts.	970,135	7,212,627	1,820,679	5,678,257	683,826
Breeze—yards	13,499	133,236	49,133	86,117	11,485
Tar—gallons.	722,173	5,654,200	26,045	5,654,426	695,902
Ammoniacal liquor—butts	17,574	193,075	196,911	..	13,738

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Total Quantity Accounted for.	Number of Public Lamps.
	Public Lights (estimated).	Private Lights (per Meter).		
Thousands. 6,330,250	Thousands. 226,552	Thousands. 5,858,884	Thousands. 6,161,154	21,514 incandes't 1,207 flat flame

The remaining statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, £31,692; coke and breeze, £17,641; tar, sulphate, and ammoniacal liquor, £47,733; and sundries, £240,876. The figures this time last year were: Coal, &c., £32,994; coke and breeze, £13,165; tar, sulphate, and ammoniacal liquor, £40,850; and sundries, £230,056. A sum of £73,424, workmen's bonuses and savings, has been deposited with the Company; and the total of the officers' superannuation and guarantee funds is £27,716. The figures last year were £54,551 and £22,018. The balance-sheet contains an entirely new item, "Monazite sand suspense account, £19,143 7s. 2d.," special reference to which is made in the report.

SOUTH SUBURBAN GAS COMPANY.

Half-Yearly Report and Accounts.

The report which the Directors of the South Suburban Gas Company will present to the proprietors at the meeting on the 11th inst. opens with the gratifying statement that the profit realized in the six months ending the 30th of June is sufficient for the payment of a dividend at the rate of 5¼ per cent. per annum, which they recommend. From the balance brought forward they have carried £2200 to the insurance fund, which will leave £3522 to go to the next half year. Having regard to the past mild winter, the increase of business is satisfactory; and this can be said generally of the operations of the company, with the exception of a matter referred to later.

The co-partnership bonus—a percentage governed by the price of gas, on the principle of the sliding-scale, on the salaries and wages of the employees—rises year by year; and for the twelve months just ended it amounts to the large sum of £3132 15s. 10d. The Directors support it on the ground that it is a good business expenditure; it being earned by the interested working, as shareholders, of the great majority of the servants of the Company, who hold a large amount of stock, and including deposits, at 3 per cent. interest, they are the owners of about £25,000, or an average of nearly £50 apiece.

The most important subject dealt with in the report is the Company's parliamentary proceedings, which have been continued through three consecutive sessions, and will, the Directors say, certainly have to be carried into a fourth. In 1903, a Bill was introduced to enable the Company to abolish the nuisance to the neighbours of the gas-works caused by the use of lime for purification, to save the cost of useless enrichment of the gas, and thus reduce the price, and to enable the Company to offer new issues of stock direct to the consumers and employees at the market price. The Bill was passed by the House of Commons after a prolonged contest before a strong Committee, all three objects being approved. Owing, however, to the opposition of the Local Authorities—the London County Council taking the lead—the House of Lords Committee struck out the main provisions, and the Bill was therefore withdrawn. In 1904, the Bill was re-introduced, and again opposed by the same parties; the clauses relating to the reduction of illuminating power and the abolition of lime purification being rejected, because the Board of Trade Committee had not issued their report on these questions. The Directors, however, got the remainder of the Bill passed, including, with some minor provisions, that for offering stock to consumers and employees, which the authorities had previously opposed. In 1905, the Bill was revived, the Board of Trade report being favourable, but again strenuously opposed by the same parties. But the House of Commons Committee granted relief from the use of lime, and the reduction of illuminating power was practically agreed; but the London County Council pressed for the imposition of a most unfair and unreasonable method of testing which could not be accepted, and the clause was withdrawn. Subsequently the London County Council, in their London Gas Bill, were defeated in Committee of the House of Lords on this question of testing, but too late for the Company's Bill. The Directors point out that the unsatisfactory part of these prolonged proceedings is the waste of money that would otherwise have gone in a reduction of price. The Company have already paid about £8500 in parliamentary charges; and adding the heavy expenses of the London County Council and the Local Authorities, the loss to the consumers and ratepayers must reach a serious amount, and all on questions raised by the Company which are proved to be right. But this is not all, for if the first Bill had passed, the saving to be effected by the abolition of useless enrichment of the gas would have resulted in an appreciable reduction in the price of gas. The opposition of the Local Authorities has caused all this loss, while two out of the three points for which they have contended have been gained by the Company in successive Bills; and the Directors think there is very little doubt, after the recent failure of the London County Council before the House of Lords, that the remaining point will be gained by next year's Bill.

The accounts accompanying the report show that the total amount of capital received up to June 30, including premium capital, was £788,415. But a total of £792,768 has been expended (£4323 in the past six months); so that the account has been overdrawn to the extent of £4353. From the revenue account, it is seen that the sale of gas produced £81,156; rental of meters and stoves, £5588; and sales of residuals, £24,359; rents bringing up the total to £111,174. On the other side of the account, the manufacture of gas cost £68,186 (this total including £45,226 for coal and labour); distribution came to £9345; and management to £4389. The item of "Co-partnership" stands at £1632 (£3132 for the year), and other payments bring up the total to £89,936; leaving a balance of £21,238 to go to the net revenue account. The sum of £20,835 is applicable for distribution. The statements relating to the working show that 65,584 tons of ordinary coal (gas oil is no longer used) were employed in the manufacture of 713,027,000 cubic feet of gas, of which 674,123,000 cubic feet were sold and 682,220,000 cubic feet accounted for. The residuals produced were: Coke, 787,020 cwt.; breeze, 17,298 yards; tar, 693,646 gallons; and ammoniacal liquor, 12,556 butts. There were 526 tons of sulphate of ammonia made and 566 tons sold during the half year.

CHEAPER GAS FOR POWER AT BIRMINGHAM.

The proposal of the Birmingham Gas Committee (*ante*, p. 186) that, from the next quarterly reading of meters, all gas used in engines—irrespective of quantity—should be supplied at the lowest current rate of 1s. 10d. per 1000 cubic feet, with a discount of 5 per cent. on the usual terms (or slightly under 1s. 9d. per 1000 cubic feet net), came before the City Council last Tuesday.

Alderman Sir Hallewell Rogers, in moving the adoption of the recommendation, stated that from time to time the Committee had had representations made to them by the smaller manufacturers in the city to the effect that their competitors in other towns and in the surrounding districts were paying lower prices for the gas they used for power. The Committee had carefully considered the matter; and the recommendation he now submitted was the result. The proposed reduction would help the manufacturers of the city, and through them the working classes. Moreover, they must remember that this department of the Corporation was a commercial undertaking, and that therefore it must be conducted on business lines. In common with other gas-works throughout the country, they were face to face with competitors—especially in regard to the manufacture of gas for power—and consequently they must be prepared to meet this competition. Mr. Walthall asked if it were not possible to bring the reduction down to 1s. 6d. per 1000 cubic feet. Mr. Whittall said it seemed to him the reduction was rather commencing at the wrong end. The largest reduction should be given to the largest consumers; but if the proposal were carried, it was the smaller consumers who would derive the most benefit. In reply, Sir Hallewell Rogers said the biggest manufacturers had already put down gas-producing plant; and perhaps, with the large staffs of men they could devote to the work, this proved more economical for those firms. What the Committee wished to do was to stop the smaller manufacturers from putting down plant, by making it cheaper for them to accept the terms offered by the Committee. Most of the consumers were now paying 2s. 3d. per 1000 cubic feet for power; and this would be brought down to 1s. 10d., or 5d. less, and would, he thought, suffice to meet the competition, without any further reduction such as was suggested by Councillor Walthall.

The resolution was carried.

SALFORD CORPORATION GAS SUPPLY.

The Past Year's Working.

The report of the Gas Committee of the Salford Corporation for the year ending the 31st of March states that, notwithstanding the condition of trade which prevailed, there was a considerable increase in the number of consumers during the twelve months. The use of gas through prepayment meters has also continued to extend in a satisfactory manner. The sales of gas, however, show a decrease of 2·21 per cent., which is ascribed to the more extended use of incandescent burners. On July 1 last, the price of gas was reduced 1d. per 1000 cubic feet to all consumers by ordinary meter; and to prepayment consumers an increase was made in the quantity given from 25 to 30 cubic feet for 1d.—equivalent to a reduced charge of 6⅔d. per 1000 cubic feet. The offices in Bloom Street having become too small for the accommodation required, the Committee have purchased additional land and buildings in Chapel Street and Bloom Street for the purposes of the Gas-Stoves Department and for general show-rooms, where the many desirable and economical appliances for the use of gas, both for domestic and business purposes, can be adequately displayed to intending purchasers, and from which further extensions of business are anticipated. The works and plant were maintained by the Engineer and Manager (Mr. W. W. Woodward) in a thoroughly efficient condition; and

the new installation of stoking machinery and coke-handling plant for the Liverpool Street retort-house are approaching completion. The coal and cannel carbonized during the year amounted to 151,296 tons, and the quantity of gas made to 1,558,088,000 cubic feet, of an average illuminating power equal to 19·58 standard candles; the parliamentary standard being 18 candles within the borough, and 17 candles as tested in the out-districts. The receipts from residuals were not equal to the previous year. There was a slight falling off in sulphate of ammonia; but the market values of coke and tar considerably diminished. The Committee concluded by remarking that, "notwithstanding the development of electricity for lighting and power purposes, it is satisfactory to note that the use of gas is still extending, and that there is a wide field for its future development. Among other changes impending should be borne in mind the advantages of cheaper production. It is now quite clear that the use of cannel or other enrichments is no longer necessary, and that early consideration should be given to the fact that gas of a lower illuminating power, coupled with a corresponding reduction in price, will be a positive advantage to the whole community. Parliamentary sanction will, however, be required before this desirable economy can be attained."

The year's accounts show that the sale of gas produced £163,254; rental of stoves, £2189; residual products, £51,423; and rents, £491 —making a total of £217,357. The expenditure on manufacture of gas came to £115,904; on distribution, to £12,607; on rents, rates, and taxes, to £15,420; on stove fixing, &c., to £1410; repair of public lamps, to £353; bad debts written off, to £375; and on management, to £6206—the total outlay being £152,276. The balance carried to the profit and loss account is £65,081. After paying the interest and annuities, and setting aside £16,381 in redemption of loans, and writing off £5000 for depreciation, there is left a balance of £23,630 as net profit for the year.

LANCASTER CORPORATION GAS SUPPLY.

Price for Power—A Question of Duty.

The minutes of the Gas Committee which were submitted on Wednesday, at the monthly meeting of the Lancaster Town Council, stated that a Sub-Committee had considered an application forwarded by the Metropolitan Amalgamated Railway Carriage and Waggon Company, Limited, for a preferential price for gas to be used for motive power, and that they had resolved that the following scale of charges for gas for motive power and trade purposes be submitted to the Gas Committee for adoption: Under 50,000 cubic feet per annum, 1s. 11d. per 1000 feet; 50,000 and under 250,000 feet, 1s. 10d.; 250,000 and under 1,000,000 feet, 1s. 9d.; 1,000,000 and under 2,000,000 feet, 1s. 8d.; 2,000,000 and under 6,000,000 feet, 1s. 7d.; 6,000,000 feet and upwards, 1s. 6d. Payments to be made quarterly, before the expiration of 28 days after the delivery of the account; and, if not paid within that period, the ordinary price as at present in force to be charged; the reduction to come into operation after the June meter readings. At a subsequent meeting of the Gas Committee, letters were read from the Waggon Company stating that, unless they could get the gas from the Corporation at 1s. per 1000 cubic feet, they must make other arrangements. The minutes of the Sub-Committee were adopted. The Gas Committee decided that they were unable to see their way to lay a gas-main as suggested in Piccadilly, Scotforth. Messrs. Huntington and Seward were appointed to confer with the members of the Lighting Committee as to the provision of incandescent burners in the street-lamps of the town.

The confirmation of these minutes was moved by Alderman Bowness, who said it would be remembered that the previous month the Committee were in negotiation with the Waggon Company with regard to preferential prices for the supply of gas for power. They were very pleased to receive the application, and were in hopes that they would be able to successfully negotiate terms, because they were desirous to help on any commercial undertaking which would be for the benefit of the town by supplying cheap gas. The Sub-Committee went very fully into the matter, and found they could not furnish gas in justice to the ratepayers, and obtain even a limited profit, for less than 1s. 6d. per 1000 cubic feet on a certain amount consumed. The conditions were submitted to the Company, who were very positive in their refusal of the terms, and stated that unless the Corporation reduced the price very materially they would have to take other means of getting what they wanted. The Committee were very sorry to receive this communication; but at present that was where the matter stood, and they were waiting for something to turn up. Then there was the question of fixing a lamp for the lighting of Piccadilly, Scotforth. The Gas Committee felt it was not their duty to light the town; it was a duty that devolved upon the Lighting Committee. The latter had asked the Gas Committee to lay a main for the lighting of this solitary lamp, and the cost of the main would be £22. There was only one house on the way; but further on there were three houses, the occupants of which might possibly be consumers of gas. To extend the main further to supply those houses would, however, involve another £22. The Gas Committee thought the Lighting Committee should pay for the laying of the main for this lamp; and if they did this, the Gas Committee would provide the gas. With regard to the lighting of the streets by incandescent lamps, a Committee had been appointed to deal with the matter; and possibly as the result of their report there would be a further call upon the Lighting Committee to do their duty.

The motion having been seconded, a long discussion ensued upon the question of erecting the gas-lamp referred to. Mr. Jackson pointed out that the usual course was for the Gas Committee to lay the mains, and the Lighting Committee to undertake the lighting; while Mr. Greene stated that during the twenty-two years he had been a member of the Lighting Committee, they had never paid for the laying of a main, other than in a private road. Mr. Wright said the point was whether it was in the public interest to light the road. He admitted that the Gas Committee had been generous; and he wanted them to continue their generosity, if they could do so without a very great expenditure of profits. They had done splendidly in the past, the Department being well managed and governed by an excellent Committee; but he asked, Who were to be the arbiters of the lighting of the town? According to the policy they had adopted, the Gas Committee were to be the arbiters, and they had no right to take this position. He suggested that the Lighting Committee should take the matter into consideration again, and that further negotiations should be entered into, so that for the sake of a paltry £22 this improvement should not be blocked. With this object in view, he moved that the matter be referred back to the Committee.

Mr. Huntington asked whether any other medium than gas had been considered for lighting the outlying places, and thought that, in view of the fact that the Gas Department was a commercial undertaking, the Gas Committee were justified in the stand they had made. Mr. Kirkby said it was true that in the past the Gas Committee had laid the mains; but this was an exceptional case. It would cost £40 to carry out the proposal; and supposing they had 100 lamps to erect on the same principle, what would become of their profits? It would be a case of killing the goose that laid the golden eggs. Alderman Bell suggested, as a way out of the difficulty, that Alderman Bowness should take this particular minute back, and that Mr. Wright should withdraw his amendment. He added that he was not inclined to vote for the amendment, because he had a great admiration for the way in which the work of the Gas Committee was carried on. Alderman Bowness replied that the Gas Committee already contributed £1500 or £1600 a year in gas for the lighting of the town, which was for the advantage of the public. To ask the Committee to keep going on in that way was practically to tie their hands, and prevent them from making further developments. The least the Lighting Committee could do would be to contribute something towards the erection of the lamp.

The Mayor (Mr. Heald) said there had been a lot of talk about what appeared to be a simple and trivial matter—the construction of a main to light a single lamp in an outlying district. The affair, however, was not so simple as it seemed. It opened up a subject of very considerable importance. If the Corporation decided that the Gas Committee should lay a main to supply a single gas-lamp at a cost of £22, *plus* the annual cost of maintenance, it would be putting a burden upon the Committee which, as a trading community, they were not entitled to have laid upon them. The Committee were obliged to consider the matter from one standpoint only—Would it be remunerative? From what had been said, it would not be remunerative; and therefore it had been decided not to lay the main. As the question presented itself to him it was in this form, Whose duty is it to light the town? Of course, it was the duty of the Lighting Committee, which was purely a spending and not a trading Committee. If it was absolutely necessary to light that particular part, the duty rested with the Lighting Committee, and not with the Gas Committee.

After some further discussion, the amendment was withdrawn, and the minutes were confirmed with the exception of the one relating to the main and lamp in Piccadilly, which was held over.

GAS AFFAIRS IN BOSTON (MASS.).

In the last number of the "JOURNAL" we gave an account of the consolidation of the Gas Companies of Boston (Mass.). We learn from "Progressive Age" that under the new organization the requirements of the consumers will have a great deal more attention than they have hitherto received. The President of the Consolidated Company (Mr. James L. Richards) is a man of remarkable business capacity; and it was he who worked out the plan of consolidation and carried it into effect. He early announced his intention of taking the direct management of the concern, reducing the price of gas a year before the time set by the Legislature, inaugurating 90 c. gas, making range and cellar connections free, investigating every complaint of poor quality of gas or service, establishing better relations between the Company and the consumers, saving Boston and Brookline $265,000 annually by giving free connections, and having a staff of agents to call upon the consumers. The last scheme has been carried into effect, and on the 5th ult. the Company sent out twenty men to meet personally the large and small consumers of gas, with instructions to co-operate with them with the view of greatly increasing the popularity of gas for lighting, fuel, and power purposes. The field of operations of this staff has upon it a population of 600,000; and the annual consumption of gas has been about 3000 million cubic feet. But under the old *régime* no attempt was made to push business—it was simply waited for; whereas under the new, it will be vigorously sought. Special attention will be devoted to increasing the use of gas-engines. There are now in the Boston district only 250 of these motors, and the demonstration which the Company will make is expected to greatly increase the introduction of gas for power purposes. The men are sent out under the supervision of the Secretary (Mr. Edgar N. Wrightington), who has frequent conferences with them for the general discussion of any questions that arise. On the 1st ult. the price to all consumers was 95 c. per 1000 cubic feet—a reduction of 5 c., which will entail a loss of $150,000 per annum on the Company, unless the new arrangements above referred to lead to increased consumption. Gas supplied to the public buildings is charged for at the rate of 79·3 c. per 1000 cubic feet; and on the 1st of January next it will be brought down to 74·3 c. These prices are lower than the average—84·3 c.—charged by all the companies for gas supplied to the public buildings. The Company have petitioned the Board of Gas and Electric Light Commissioners for their approval to contracts entered into between them and the New England, Waltham, and Chelsea Gas Companies. This is the first hearing held by the Board on the question of contracts between gas companies, and is the result of the Special Act passed by the last Legislature, which provided as follows: "The Boston Consolidated Gas Company shall not purchase any gas until the Board of Gas and Electric Light Commissioners have found, after public hearing, that the price to be paid for the gas to be purchased is less than it would cost the Boston Consolidated Gas Company to make their gas in works of standard type properly equipped, suitably situated, and of sufficient capacity to make all the gas required by the whole district supplied by the Company."

ACETYLENE EXPLOSION AT THE ASHTON GAS-WORKS.

Mr. R. Hooton's Son Injured.

Considerable alarm was caused last Tuesday evening in the neighbourhood of the Ashton-under-Lyne Gas-Works by a loud report, followed by a cloud of dust and *débris*; and it was at once ascertained that an explosion had occurred in one of the buildings connected with the works, and that Mr. Harry Hooton, the son of Mr. R. Hooton, the Manager, had been badly burnt about the face and hands. It appears that at the time of the occurrence Mr. Harry Hooton (who is regarded as a very fair chemist) was engaged in research work, for which purpose he was employing a mixture of calcium carbide and soda—using soda instead of water. By some means or other, he must have got the building in which he was occupied full of acetylene, though whether the mixture was an explosive one or whether the gas became ignited from a jet near by, it is impossible to say. We are glad to be able to state that Mr. Hooton is making good progress towards recovery.

THE LABOUR TROUBLE AT THE BOLTON GAS-WORKS.

As announced in the "JOURNAL" for the 18th ult., a section of the men employed at the Bolton Corporation Gas-Works have been urging their claims upon the Gas Committee for increased remuneration, and notices were tendered, to expire on the 21st, which were formally "received" by the Committee. Subsequently, however, 80 of the men, out of a total of about 130, withdrew their notices; those who adhered to their position being the men employed at the Gas Street works, where machine stoking is employed. A meeting was held on the 18th ult., at which there was an attendance of about 90, and the situation was discussed at considerable length. The men complained that the Gas Committee would not compare their wages with those of employees in analogous circumstances in other towns. The men had a return prepared which showed that in the Manchester, Salford, and Stretford Gas-Works the chargers earn 5s. 9d. per shift of eight hours, whereas they obtain 5s. 3d. in Bolton, and ask for 5s. 6d. In Manchester and Stretford, the drawers get 5s. 9d., and in Salford 5s. 6d.; whereas in Bolton they receive 5s. 3d., and ask for 5s. 6d. In Oldham the drawers and chargers have 5s. 3d., in Blackburn 5s. 4d.; and in Manchester and Salford the attendants receive 5s. 3d., which is asked for in Bolton, where the pay is 5s. 2d. The General Purposes Committee of the Corporation discussed the subject for some time on the above-named day; but they did not pass any resolution.

In view of the dispute, a representative of a local paper had an interview with the Gas Manager (Mr. W. Smith), who went fully into the matter, and pointed out that the conditions of work were different in various gas-works. He gave his interviewer a number of figures relating to neighbouring towns in support of his statements. Taking this into account, he contended that Bolton paid considerably above the average wage in Lancashire for the same class of labour. In conclusion, he declared that both the Gas Committee and he had always been anxious to treat the men in their employ in the most liberal way, and had also been very considerate in regard to the old employees. Later in the week efforts were made to bring about a settlement of the dispute, but without effect. The result is that 51 of the men at the Lum Street station have come out on strike.

THE PUBLIC LIGHTING OF MALTON.

Electricity Adopted.

At a Special Meeting, the Malton Urban District Council finally decided (by six votes to two, and two neutral) to adopt the Lighting Committee's recommendation that the tender of the Northern Counties Electricity Supply Company to light the entire district with electricity should be accepted. Mr. Henry Tobey, the Engineer of the Gas Company, and Chairman of the Council, presided. The contract is for a period of three years; the prices being as follows: 2 250-candle power lamps at £4 10s. each; 23 100-candle lamps at £3 10s. each; and 153 70-candle lamps at £1 15s. each—making a total of £357 5s. for 178 lamps. The first idea of the Council was to divide the contract between the Gas and Electricity Companies; but the Gas Company, as recorded in last week's "JOURNAL" (p. 272), refused to accede to the apportionment suggested.

Mr. Plowman, in moving the confirmation of the Committee's minutes, said he should like to point out for the information of the Council and the general public how matters stood, and how they had stood, and to show some reasons why the Committee had taken their present position. Last year's gas account was £446 16s. 6d.; this year's tender to light the whole district was £404 10s. That was a reduction on last year of £42 6s. 6d. The Electric Light Company's tender was £357 5s.—a reduction on the Gas Company's tender for last year of £89 11s. 6d. Taking the present reduction of the Gas Company in what they called their revised tender, and which the Committee wisely refused to accept—viz., £343 15s.—this would mean that during the past seven years they had paid £899 9s. 1d. above the present tender. And not only so, but they had not had such a good light as they had been having the last year or two. They could just see what a come-down there was, and how they had been had. This was very conclusive to any reasonable minded man that some action should have been taken, especially when competition had come to their doors. They did not wish to be discourteous to the Gas Company at all; but the Committee thought, and reasonably thought, that as the electric light had come and broken down such a monopoly, some consideration should be given them. After they had decided to divide the lighting, the Gas Company took umbrage and withdrew their tender. Then what did they do? They repented, of course, and like a whipped spaniel crouched back again to the Council. He was very glad they did in one way, because there was a time when the Council had to crouch to the Company, so they would see what a blessing it was to break that monopoly away. Then came the revised tender of £343 15s. When the Gas Company sent this letter in, he was opposed to its being entertained, as it was entirely out of order; but some thought they would like to have it read, and when that was done they were entirely disgusted with it. It was simply putting a red rag before the bull. They were disgusted with the sneaking way it came in. After the letter was read, a large majority of the Committee refused—and rightly—to entertain it. If they had entertained it, they would have sacrificed their honour as men, and sacrificed all principle, and been a laughing-stock to the ratepayers—and serve them right. Therefore the ratepayers ought to give the Council credit, and be thankful that electricity had come into their midst; and it had come to stay. They might as well try to drive the tide back as to stop it. As certainly as paraffin succeeded candles, and gas succeeded paraffin, so would electricity succeed gas.

Mr. Hall demanded that the letter of the Gas Company which Mr. Plowman had referred to should be read, so that the ratepayers might judge. He said that in the tender then given there was a reduction of £123 18s., or equivalent to a 1½d. rate. To this Mr. Plowman retorted that it was only £13 10s. below the Electric Light Company's tender. Mr. Sadler next took up the debate; remarking that they would not have had all this bother if the two sections into which the district had been divided had been put properly before both Companies to start with. One section was in a nutshell; but the other was very wide, including the alleys and back streets. If everything had been made clear, there would have been no quibbling about the different sections. Mr. Plowman's remarks were unfair to the Gas Company. Open spaces required no lighting—only the dark places. They asked the Gas Company to light the dark places, and let the Electric Light Company have where no light was wanted. If the matter had been properly dealt with at first, it would have saved all this nonsense.

The Clerk then read the Gas Company's letter, as follows:—

Dear Sir,—We beg to acknowledge the receipt of schedule of lamps from the Surveyor which has arrived at last. The District B seems to us to be so unfairly proportioned that we suggest that three members of your Council, with their Clerk and Surveyor, meet the same number of our Directors and their Manager, and endeavour to arrange such a division of the area as should be reasonably fair to both Contractors. As an alternative, we beg to renew our offer to light the whole district by gas for three years, at the following amended figures:—

124 lamps, 50-candle power			at 32s. 6d.	£243 15 0
26	,,	100	,,	
26	,,	150	,,	70s. 91 0 0
2	,,	500	,,	90s. 9 0 0
				£343 15 0

If this is compared with the Electric Company's tender for lighting the whole district, which was, we believe, as follows:—

150 lamps, 70 candle power, at 38s.				£285
26	,,	100	,,	70s. 91
2	,,	250	,,	90s. 9
				£385

It will be seen that, by adopting gas lighting for the whole area, your Council will effect a saving of £41 5s. annually, or £123 15s. in the three years' contract.

Mr. Plowman pointed out there was a misunderstanding. The Electric Company's tender being £357, it was only a saving of £13 10s. on the year, and the Committee thought they would not sacrifice their souls for £13 10s.

THE LIGHTING OF PARLIAMENT SQUARE.

High-Power Gas-Lamps to be Erected.

The Works Committee of the Westminster City Council reported last Tuesday, with reference to the Council's acceptance, about a year ago, of the tender of the Gaslight and Coke Company for the lighting of Parliament Square by means of eight 700-candle power gas-lamps, and to the postponement of the work, at the request of the Office of Works in the following October, that on the 29th of June last the Council decided to proceed with the work, and to inform the Office of Works accordingly. Thereupon a conference took place between representatives of the Office of Works and the Council. Upon it being pointed out that the Council's intention was to improve the lighting of only the portions of the square within their jurisdiction, the representatives of the Office of Works said they would have no objection. They also stated that the scheme of improved incandescent gas lighting for the precincts of the Houses of Parliament generally which they had in hand embraced the retention of four lamps on the public footway within the Council's jurisdiction. In the result it was arranged as follows: (1) That the Council shall forthwith erect five high-power incandescent gas-lamps upon the refuges in the roadway—one at the west end of Bridge Street, one on the north side, and two on the west side of the square, and one in Broad Sanctuary, opposite the south-east corner of the Guildhall; (2) that upon the installation of the high-power lamps the Council shall cease to pay for the lighting of the existing lamps maintained by the Board at the expense of the Council, which shall, subject to the next clause, be put out of lighting, and, if the Board think fit, be removed by, and at the expense of, the Board; and (3) that the Council shall consent to four existing lamps on the public footway of Parliament Square and Bridge Street, within their jurisdiction, being retained and kept in lighting by, and at the expense of, the Board; the Board agreeing to pay to the Council an acknowledgment rent of 1s. per lamp per annum, and to remove the lamps within three months of the receipt of written notice from the Council to do so. These arrangements are to be embodied in an agreement to be entered into between the Office of Works and the Council. The Gaslight and Coke Company have accordingly been instructed to proceed with the erection of the five lamps.

THE SUPERSESSION OF ELECTRICITY BY GAS FOR THE PUBLIC LIGHTING OF THE CITY.

Protest by the City of London Electric Lighting Company.

At the Meeting of the Court of Common Council of the City of London last Thursday, the following letter from the City of London Electric Lighting Company, Limited, was submitted, and referred to the Streets Committee for consideration.

The position which has arisen by reason of your letter on the 17th ult., in which you state that the Streets Committee have been authorized to revert to the use of gas for certain of the main thoroughfares of the City, and requesting my Company to remove its electric lamps by the 29th of September next, has been carefully considered by my Board; and I am now directed to write you in reply as follows.

Many members of the Court of Common Council may be unaware of, or may have forgotten, the circumstances under which the three contracts for the electric lighting of the eastern, central, and western districts of the City were entered into; and I therefore shortly recapitulate them. Specifications were prepared by the Corporation, and tenders were asked for in accordance therewith. The tenders of the Laing, Wharton, and Down Syndicate for the eastern district, and of the Brush Electrical Engineering Company for the central and western districts respectively were accepted, and were embodied in three contracts. Under these contracts, the Contractors were placed under obligations to make a large expenditure on plant, mains, lamps, &c., for the public lighting within a certain time, and to supply the public lamps with energy at a very low rate in consideration of certain advantages as regards private lighting given to the Contractors, which advantages, as events have happened, have proved to be illusory. The contracts were subject to Provisional Orders (or Acts of Parliament) being obtained by the Contractors; and the Corporation stipulated that the contracts should be embodied in the Provisional Orders. These latter were granted; but the Board of Trade would only allow certain of the terms of the contracts, which imposed obligations on the Contractors, to be inserted in the Orders, including the obligation to sell that part of the undertaking relating to public lighting to the Corporation upon more favourable terms than were made applicable to the remainder of the undertaking. These three contracts and Provisional Orders were in due course transferred to my Company with the consent of the Corporation. My Company had nothing to do with the negotiation of the contracts and Provisional Orders, but simply took them over with all their obligations, including those relating to the public lighting.

This transfer took place in 1891; and it was not until about 1899, after my Company had expended £119,520 in respect of the public lighting, that the question of the validity of the contracts was raised by the Corporation. At the 31st of December last, this expenditure stood in my Company's capital account at £128,997. This question of the validity of the three contracts was carried through the various Courts of Law; and a final decision was given by the House of Lords, with regret, that the central and western contracts were invalid *ab initio* on the technical ground that certain members of the Corporation had a small share interest in the Brush Company—the original Contractors. Thus my Company's shareholders had to suffer for something which my Company had no hand in, as it merely, as above stated, took a transfer of the contracts with the consent of the Corporation. The contract for the eastern district was declared by the House of Lords to be valid and subsisting. Since that decision, my Company has, at the request of the Corporation, carried on the public lighting until the present time as though all the contracts were still valid.

On March 25, 1905, my Company received a letter from you inquiring upon what terms my Company would be willing to enter into a contract for lighting the main streets with improved lamps, &c. My Company replied asking for particulars of the improvements which were required; and on April 27, 1905, you replied that a specification was being prepared by the Electrical Engineer to the Corporation, of which a copy would be sent to my Company in due course. The specification has not been received; but on May 4, 1905, the Streets Committee submitted a scheme for replacing 47 electric arc lamps by gas-lamps, of which eight arc lamps are in the eastern district. My Company had no official cognizance of this scheme until the 19th of June, when a letter was received requesting my Company to remove its electric lamps from Fleet Street, Queen Victoria Street, Monument Street, and part of Lower Thames Street by the 29th of September next. To comply with this request would mean the destruction of part of the capital outlay imposed upon my Company by the contracts and Provisional Orders, and a corresponding loss of revenue of about £1222 per annum. My Board consequently felt that it was a matter which required their most careful consideration, especially as, after being requested to tender for improved public lamps, nothing further has been done, and in the meantime gas lighting has been adopted to a serious extent.

In this connection, I am to remind the members of the Corporation that my Company did not have a free hand in the selection of either the standards, the lanterns, or the glass of the present electric arc lamps, all of which were settled by the late Colonel Haywood, the then Engineer to the Commissioners of Sewers; and to point out that it is not fair to compare electrical apparatus which was the best of its kind in 1891 with modern gas apparatus. My Board would have been only too pleased to co-operate with the Corporation in improving the lighting of the streets. In all probability my Company would have been able to submit such terms as would have shown at least as great a saving as the alleged saving mentioned in the Street Committee's report of May 4, 1905; and the improved electric lamps would have afforded better illumination than any form of gas lighting. But, as stated above, my Company had no opportunity of tendering, and have never received the specification promised by your letter of April 27 last.

My Board have been precluded from incurring on their own initiative any further large expenditure on the public lighting owing to the uncertainty of the position of my Company as regards the public lighting. It would manifestly have been impolitic for my Company to do so without the security of a fresh contract, especially in view of Mr. D. J. Ross's statement in his letter of Oct. 19, 1904, to my Company "that the Corporation does not recognize the existence of any contract for the eastern district of the City." My Board cannot agree with this view, as they are advised that there can be no question, after the decision of the House of Lords, that the eastern contract is still binding on the Corporation and my Company. As regards the central and western contracts, apart from the legal position, my Board submit that in equity my Company has a just claim upon the Corporation that it should not destroy, to the considerable extent involved, the capital expenditure made by my Company in pursuance of the obligations imposed upon it by the Corporation. My Board are anxious that the present amicable relations between my Company and the Corporation should not be disturbed; and I am therefore directed to suggest that a Special Committee should be deputed by the Corporation to confer in a friendly manner with my Board with a view to the public lighting of the streets by my Company being settled in a manner satisfactory to both parties.

Commenting on this letter, the "City Press" last Saturday said: "It will be remembered that in May last the Streets Committee of the Corporation were authorized to expend close upon £2000 on the extension of their experiments in street lighting. The use of gas for the side streets of the City under the scheme carried out by the Committee has proved a success in every way. The illumination is entirely satisfactory, and in comparison with the electric light, if that were suitable for the narrower thoroughfares, more economical. As a matter of fact, it is now generally recognized that for street lighting incandescent and high-pressure gas-lamps are preferable to the electric light on their own merits, even if the cost were the same. The Committee therefore proposed to make a final experiment by reverting to incandescent gas in Fleet Street, and to gas under the high-pressure system in Queen Victoria Street and a part of Thames Street. The annual saving by the abandonment of the electric light in favour of gas in these thoroughfares was estimated at £363—a very considerable economy, and full of promise if the arrangement is carried out over the whole of the City area. Consequent on the sanction of this proposal by the Common Council, the City of London Electric Lighting Company have been required to remove their lamps in the streets mentioned by the 29th of September; and against this order they have made a strong protest, which was submitted to the Common Council on Thursday. . . . The really important parts of the protest are those which deal with the respective merits of gas and electricity; and what is said on these points may be easily summarized. The Company admit that their lamps are not up to date, and they argue that it is not fair to compare electrical apparatus which was the best of its kind with modern gas apparatus. They do not think they are to blame for this, as, it is said, they have been precluded from incurring any further large expenditure owing to the uncertainty of their position—two out of the three contracts having been annulled, and the validity of the third questioned. They assert that, if the Streets Committee had allowed them to co-operate in improving the lighting of the streets, they would in all probability have been enabled to submit terms showing as great a saving as the figures quoted above, while the illumination would have been better. The Directors therefore ask for the appointment of a Special Committee to confer with them on the subject. As the matter was referred to the Streets Committee, no doubt any desired conference will be arranged for; and if it were solely a matter of price which was under discussion, there would be some hope of a conclusion satisfactory to both parties being arrived at. It is not so, however. The question is whether some of the modern forms of gas lighting are not absolutely and intrinsically better for street lighting than any form of electric lamp that has yet been made available. Possibly the last word on that subject has not yet been said on either side; but we are compelled to admit that for this purpose the incandescent gas-light has outrivalled electricity. The next step is for the electricians to take."

GAS v. ELECTRICITY AT BRIERLEY HILL.

Early last year, a new Free Library and Technical School, fitted throughout with electricity, was opened at Brierley Hill. After about twelve months' use, a report was presented to the Education Committee from the Head Master complaining of the very unsatisfactory lighting of the rooms. A complaint was also received from the County Director of Art to the same effect. As the Committee were likewise informed that the cost had been much more than they expected, they appointed a Sub-Committee to inquire as to the best means of improving the lighting of the schools. The Manager of the Brierley Hill Gas Company (Mr. W. C. Jones) requested to be allowed to show what could be done with gas; and permission being granted, he fixed two Welsbach lamps of 600-candle power each in two rooms. The Electric Light Company were then asked if they could improve their lighting; and they fixed an arc lamp at a distance of about 2 yards from one of the gas-lamps, for purposes of comparison. After several months' trial with both lights, the Committee reported that gas was far preferable to electricity; and the Art Master also expressed his approval of the light for the art students. They therefore recommended that the electric lighting should be discontinued, and the tender of the Gas Company accepted for the lighting of the whole building. This report was presented to the full Committee on Tuesday, and adopted; and instructions were given to the Gas Company to proceed with the work at once. At the last meeting of the Urban District Council, a contract was made with the Company to light the public lamps for a period of six years.

Croydon Water Supply.—The Croydon Corporation, who, it may be remembered, acquired the Lambeth Water Company's undertaking in Croydon, under the Metropolis Water Act, 1902, have decided to promote a Bill for providing the town with an increased supply of water. The cost of the scheme will be £260,000.

FOG, SMOKE, AND THE PUBLIC HEALTH.

The Royal Institute of Public Health, who have lately been holding their fourteenth annual congress in London, had before them last Tuesday, in the Engineering and Building Construction Section, two papers on the subject of fog and smoke, and the possibility of minimizing their deleterious effect on the public health.

The first paper, by the Hon. Rollo Russell, described the production of London fogs. Cold air, he said, collects during the night over the Metropolis as in a basin, and, being heavy, it cannot escape when the movement is slight. Before sunrise dense fog may extend to 300 feet above the town. Then fires are lighted, and great volumes of smoky, warm air, carbonic acid gas, tarry and sooty particles, and sulphurous gases are poured into the cold fog. This dirty air is very quickly cooled, and finds its level in the surrounding mass. The sun rises and shines upon the upper surface; but while it gradually evaporates and dissipates the moisture in the white country fog, it is unable to make much impression on the fog mixed with tarry sulphurous particles. The lighting of fires before sunrise effectually hinders the natural process of evaporation. Mr. Russell expressed the opinion that the character and the persistence of London fogs is not due to an excess of particles, but to particles of a certain kind. He pointed out that towns in which wood is burnt have no extra fog; whereas those burning common coal have dark days or yellow fog. If London burnt wood, anthracite, or gas, we should obtain an air as transparent in clear weather as that of Paris or Rome. Fortunately, the tendency towards the raising of the fog-cloud in recent years has been marked, and will continue with the extension of the suburbs. Dark fogs, artificially prolonged, are due to the uneconomic burning of bituminous coal; and kitchen and ordinary fires, not the furnaces of factories, are the main cause. The worst fogs are those on Sundays and Christmas Day, when extra cooking takes place over the widest area. A low estimate of the annual loss of London in money alone was £5,200,000, to which must be added £2,600,000 a year for coal wasted. Buildings and the material of structures generally are damaged. Not only do Westminster Abbey, the Houses of Parliament, St. Paul's, and other great public buildings, suffer more rapid decay, but all houses made of brick and mortar and all paint require frequent renovations on account of the smoky fogs. Mr. Russell said he believed it would well pay landlords and occupiers to contribute towards the means of an effective reduction of this heavy drain on the resources of Londoners. Among the remedies suggested by him, the most hopeful were the larger employment of central heating; improved ranges, furnaces, and fire-grates; cooking by gas; inspection of all coal-burning places which give off much smoke; improved stoking and economy, the taxation of smoky chimneys, and the taxation or prohibition of bituminous coal in London, except for use in appropriate grates; the more frequent use of anthracite or coke and gas-fires; and the extension of distributive kitchens. Possibly the best of all remedies was, he said, the removal of the people of London to the country.

The other paper was by Dr. H. A. Des Vœux, the Treasurer of the Coal Smoke Abatement Society. It was entitled "Fog and Smoke;" and the author declared that the great evil from which the people of the Metropolis suffer is the mixture of fog and smoke, beginning in October, thickening in November, thickening to suffocation in December and January, and then thinning off in February and March, to nearly disappear in April. He said that there was no reason why London should suffer more than other parts of the Thames Valley from fog pure and simple. But in London they added smoke to fog, which produced the horrible compound known as the "London particular." They must allow that fog pure and simple was unpreventable; but there were not more than a dozen days in the year in which white fog was predominant. If improvement was to come, it must be by lessening smoke, particularly early morning smoke. About 15 million tons of coal were consumed in London every year, and more than half was burnt in factories. But these establishments were looked after by the local authorities, to see that there was no infringement of the law with regard to the emission of smoke. In the kitchen, the mistress wanted efficiency, and the cook a labour-saver; and he thought the time had come when legislation might demand that all cooking must be done smokelessly. He had obtained the following authentic figures of the increase of gas-cookers in the Metropolis between 1894 and 1904: Stoves hired by consumers using ordinary meters, 120,000; do., using penny-in-the-slot meters, 350,000—total, 470,000. Hired heating-stoves had increased by 40,000; and at least three times this number had been purchased outright. Most people used gas only as an auxiliary; but the education of a person who cooked smokelessly at one time in the year was more than half completed. Smokeless cooking would remove 600,000 smoking chimneys; and he was optimist enough to believe that, with the absence of smoke from factories and from kitchen chimneys, the change in the atmosphere would be so marked that further advances might be expected to follow. Smoke in the atmosphere was one of the greatest evils attendant upon our modern civilization; it was a disgrace to that sanitation of which we were so fond of boasting; and it was a preventable evil which caused waste of money and injury to health and art.

As the result of the reading of the papers, the following resolution was unanimously passed: "This congress, being impressed with the importance of clearing the atmosphere of towns from smoke, urges on His Majesty's Government and local authorities the advisability of further efforts being made to attain this object."

BATH WATER-WORKS ARBITRATION.

Surveyors' Institution, Monday, July 24.

(Mr. DANIEL WATNEY, *Umpire.*)

The arbitration respecting a claim for compensation brought by Mr. A. W. Hick against the Corporation of Bath, the first two days' proceedings in which were reported in last week's "JOURNAL" (p. 265) was concluded to-day, when the remaining witnesses for the Corporation were heard.

Mr. FOOTE, K.C., and Mr. GREGORY appeared for the claimant; Mr. WAUGH, K.C., and Mr. SIMON represented the Corporation.

Mr. *C. C. Spackman*, land agent and surveyor, in the course of his evidence, put in a total estimate of compensation of £808. He said he could not see any means by which the property could be treated as a building site, unless a road were constructed at considerable expense. Supposing it were to be regarded as potential building land, its building value should be deferred for fifteen years at least. He agreed with Mr. Fox's estimate that the amount to be obtained by water-rentals in

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 305.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
500,000	10	Apl. 13	10½	Alliance & Dublin 10 p.c.	20½—21½	..	4 17 8
160,000	10	,,	7½	Do. 7 p.c.	14½—15½	..	4 16 9
200,000	5	May 12	6½	Bombay, Ltd.. . . .	6½—7	..	4 12 10
140,000	5	,,	6½	Do. New, £4 paid	5—5½	..	4 14 6
50,000	10	Mch. 15	14	Bourne-) 10 p.c. . .	29½—30½	..	4 11 10
251,810	10	,,	7	mouth Gas) B 7 p.c. .	16½—17½	..	4 0 0
53,200	10	,,	6	and Water) Pref. 6 p.c.	15½—16½	..	3 12 9
380,000	Stk.	Feb. 24	12½†	Brentford Consolidated	248 - 253	..	4 18 10
300,000	,,	,,	9⅜†	Do. New . . .	188—193	..	4 18 5
50,000	,,	,,	5	Do. 5 p.c. Pref. .	127—132	..	3 15 9
206,250	,,	June 15	4	Do. 4 p.c. Deb. .	103—106	..	3 15 6
220,000	Stk.	Mch. 15	11	Brighton & Hove Orig.	225—230	..	4 15 8
246,320	,,	,,	8	Do. A. Ord. Stk. .	165—170	..	4 14 2
460,000	20	Mch. 30	10	British	40—41	..	4 17 7
100,000	Stk.	Feb. 24	6	Bromley, Ord. 5 p.c. .	120—125	..	4 16 0
165,700	,,	,,	4½	Do. do. 3½ p.c. .	90—94	..	4 15 9
500,000	10	May 12	7	Buenos Ayres (New) Ltd.	11½—12	..	5 16 8
250,000	Stk.	June 29	4	Do. 4 p.c. Deb. .	95—97	..	4 2 6
150,000	20	July 13	8¼	Cagliari, Ltd.	24—26	..	6 6 11
100,020	10	May 31	10	Cape Town & Dis., Ltd.	17—17½	..	5 14 3
100,000	10	Apl. 28	4½	Do. 4½ p.c Pref.. .	10—10½	..	4 5 9
50,000	50	May 2	6	Do. 6 p.c. 1st Mort.	52—54	..	5 11 1
50,000	Stk.	June 29	4½	Do. 4½ p.c. Deb. Stk.	100—102	..	4 8 3
1,400,000	Stk.	Feb. 24	5⅛	Commercial 4 p.c Stk. .	116—119	..	4 7 4
560,000	,,	,,	5	Do. 3½ p.c. do. .	112—115	..	4 6 11
450,000	,,	June 15	3	Do. 3 p.c. Deb. Stk.	85—87	..	3 9 0
800,000	Stk.	,,	6	Continental Union, Ltd.	107—112	+2	5 7 2
200,000	,,	,,	7	Do. 7 p c Pref.	137—142	..	4 18 7
424,070	Stk.	Feb. 18	5½	Derby Con. Stk. . . .	124—126	..	4 7 4
55,000	,,	June 3	4	Do. Deb. Stk. . . .	108—110	..	3 12 9
486,090	10	July 28	11	European, Ltd. . . .	21½—22½*	..	4 17 9
354,060	10	,,	11	Do. £7 10s. paid	14½—15½*	..	5 6 5
15,221,235	Stk.	Feb. 10	4⅛	Gas-) 4 p.c. Ord. . .	99—100	..	4 8 0
2,600,000	,,	,,	3½	light) 3½ p.c. max. .	92—94	..	3 14 6
3,799,735	,,	,,	4	and) 4 p.c. Con. Pref.	109—111	..	3 12 1
4,193 975	,,	June 15	3	Coke) 3 p.c. Con. Deb.	88—90	..	3 6 8
258,740	Stk.	Mch. 15	5	Hastings & St. L. 3½ p.c.	100—103	..	4 17 1
70,000	10	Apl. 28	11	Hongkong & China, Ltd.	18—19	..	5 15 9
3,800,000	Stk.	May 12	10	Imperial Continental .	211—214	..	4 13 6
473,600	Stk.	Feb. 10	3½	Do. 3½ p.c. Deb. Red.	96—98	..	3 11 5
175,242	Stk.	Mch. 15	6	Lea Bridge Ord. 5 p.c. .	120—125	..	4 16 0
561,000	Stk.	Feb. 24	10	Liverpool United A . .	226—228	+2	4 7 9
718,100	,,	,,	7	Do. do. B .	167½—168½	+1	4 3 1

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
306,083	Stk.	June 29	4	L'rpool Unit'd Deb. Stk.	111—113	..	3 10 10
75,000	5		5	Malta & Medn., Ltd. .	4—4½	..	5 11 1
560,000	100	Apl. ,, 1	5	Met. of) 5 p.c. Deb..	102—104	..	4 16 2
250,000	100	,,	4½	Melbourne) 4½ p.c. Deb.	102—104	..	4 6 7
541,920	20	May 31	3½	Monte Video, Ltd. . .	11—12	..	5 16 8
1,565,892	Stk.	Feb. 24	4½	Newc'tle & G'tesh'd Con.	108—109	..	4 4 10
406,025	Stk.	June 29	3½	Do. 3½ p.c. Deb.	92—93	..	3 15 3
15,000	10	Feb. 24	10	North Middlesex 10 p.c.	19—20	..	5 0 0
52,940	1/	,,	7	Do. 7 p.c.	13—14	..	5 0 0
300,000	Stk.	May 12	8	Oriental, Ltd. . . .	145—148	..	5 8 1
600,000	5	Mch. 30	7	Ottoman, Ltd. . . .	6—6½	..	5 12 0
168,255	Stk.	—	6½	Plym'th & St'house 5 p.c.	—	..	—
398,490	5	Apl. 28	6	Primitiva Ord. . . .	5¾—6	..	5 0 0
796,980	5	July 28	5	Do. 5 p.c. Pref. .	5⅝—5¾*	..	4 13 0
488,900	100	June 1	4	Do. 4 p.c. Deb. .	96—98	+1	4 1 8
851,070	10	Apl. 28	7	River Plate Ord. . . .	12¼—12⅜	+¼	5 9 10
300,000	Stk.	June 29	4	Do. 4 p.c. Deb. .	95—97	..	4 2 6
250,000	10	Apl. 13	7	San Paulo, Ltd. . . .	12⅜—13¼	..	5 5 8
70,000	50	July 1	5	Do. 5 p.c. Deb. .	51—53	..	4 14 4
135,000	Stk.	Mar. 15	10	Sheffield A	237—239	+1	4 3 8
209,984	,,	,,	10	Do. B	237—239	+1	4 3 8
523,498	,,	,,	10	Do. C	237—239	+1	4 3 8
123,998	Stk.	Mch. 30	5	Shrewsbury Ord. 5 p.c.	107—110	..	4 10 11
70,000	10	May 31	10	South African	154—16½	..	6 1 3
6,250,000	Stk.	Feb. 10	5½	South Met., 4 p.c. Ord.	130—132	..	4 3 4
1,832,700	,,	July 13	3	Do. 3 p.c. Deb.	89—91	..	3 5 11
575,020	Stk.	Feb. 24	5½	S'th Suburb'n Ord. 5 p.c.	121—124	..	4 8 9
60,000	,,	,,	5	Do. 5 p.c. Pref. . .	125—130	..	3 16 11
112,533	,,	July 13	5	Do. 5 p.c. Deb. Stk.	127—132	..	3 15 9
502,310	Stk.	May 12	5	Southampton Ord. . . .	107—110	..	4 10 11
87,950	,,	—	4	Do. 4 p.c. Deb.	—	..	—
120,000	Stk.	Feb. 24	6¼	Tottenham) A 5 p.c. .	125—128	..	4 17 8
338,020	,,	,,	4½	and) B 3½ p.c. .	98—101	..	4 14 1
125,000	,,	June 29	4	Edmonton) 4 p.c. Deb.	105—108	..	3 14 1
182,380	10	June 15	8	Tuscan, Ltd.	9½—10	..	8 0 0
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	100—102	..	4 18 0
30,000	Stk.	Feb. 24	7⅜	Wands-) A 5 p.c. . .	163—168	..	4 12 3
255,636	,,	,,	6¼	worth) B 3½ p.c. . .	135—140	..	4 9 3
60,000	,,	,,	5⅛	and) C 3½ p.c. . .	114—116	..	4 13 6
57,564	,,	June 29	3	Putney) 3 p.c. Deb. Stk.	80—85	..	3 10 7
745,872	,,	Mch. 15	5	West Ham 5 p.c. Ord. .	102—104	..	4 16 2
185,000	,,	,,	5	Do. 5 p.c. Pref. . .	123—126	..	3 19 4
193,300	,,	June 29	4	Do. 4 p.c. Deb. Stk.	104—109	..	3 13 5

† Next dividend will be at this rate.

Prices marked * are "Ex div."

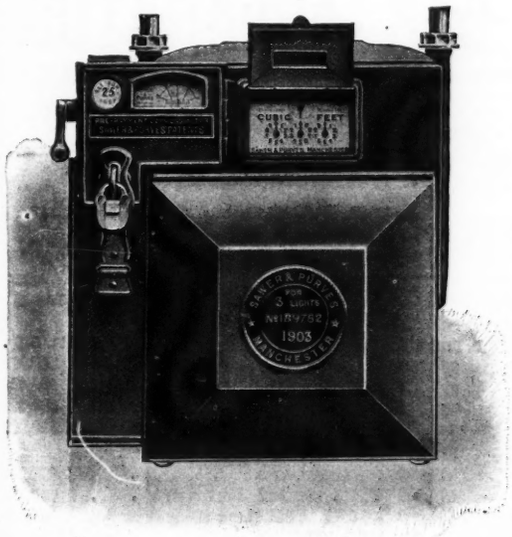
the middle zone was £21 6s., on the assumption that all the houses were let. Twenty years' purchase of this was the outside value—giving £426; and that was the present capital value. For possible depreciation of 27 acres in view of the restrictive covenant, he allowed £10 per acre. The surface damage had been agreed at £302.

In cross-examination by Mr. FOOTE, the witness held that there was no building value in the upper part of the lands at Bath Easton. The building value in the lower zone, out of which the water value would be obtained, was £236. He put the building value there at £60 per acre, and the agricultural value at about the same. He put the 27 acres at £40 an acre outside value. In allowing the £10 per acre, he considered that something must be paid for damage.

Mr. WAUGH, in summing up the case for the Corporation, said that though an attempt had been made to bolster up the claim for water, the witnesses had not ventured to pledge themselves that a building scheme was feasible, and no details had been given as to the cost of the construction of the road. It was obvious that no road would be allowed to be made as a new street by the new authority, unless drains were laid for carrying off the surface water, and unless sewers were put in for the purpose of developing the building estate. All these things it would be essential to do before they got a single customer. Mr. Hick had to make the road; and until it was made he would not get a single customer. According to their own account, it would be ten years before he had any return for his money. How could this be a feasible scheme, when they were going to run the risk of losing £3000 for the sake of getting £3000? It was absurd; but if the figures given for the Corporation as to the cost of making the road were correct—if it came to anything like £3 per yard instead of 25s.—then under no circumstances would anybody dream of constructing the road. Until the scheme was really put forward by the Corporation—until they were actually on the site—the evidence was that Mr. Hick himself never contemplated developing his land for building purposes. The plan which had been put in was a plan which was not prepared, and upon which no instructions were given, until some time at the beginning of this or the end of last year—long after the Bath Corporation attempted to acquire the springs. The whole thing was an afterthought. With regard to the water, the case that was attempted to be made out was the value of the water to Mr. Hick or to a purchaser; but for no purpose would these springs have been required unless the Corporation had come forward. The water scheme had been just as ill-considered as the building scheme. They could only make up the price by inflating the water-rents. The Court had been told that the Corporation were only too anxious to supply every possible customer. Could Mr. Hick get a sixpence more for water-rents out of the people who became the occupiers of the premises than the Corporation themselves were willing to supply at? He ventured to think he could not. Under no circumstances could he compete with the Corporation, because it had been pointed out there was no adequate protection in case of fire with only 15,000 gallons in store. Therefore it was putting it in Mr. Hick's favour, as far as they could, to take the same charges that the Corporation were making at the present time, and would make if the houses were erected. It came to this—that £99 15s., according to the evidence of Mr. Fox, was the total revenue which, assuming all the houses were erected, they would be able to get from the scheme. And then came the working expenses, which Mr. Fox had given. The amount would come out, with interest on capital, at £135 15s. In other words, there would be a net loss, if the water scheme were carried out, of £36 per annum, assuming that every house was occupied. Under these circumstances, the whole arrangement must be a loss, even supposing they had the buildings there. But he asserted that they would not get the houses, because the cost of making the road was too great. As to the number of years' purchase, it must be precarious. There would be competition with the Corporation, and the scheme would not be under statutory powers. There would be no way to recover the rents except by action; and the water, of course, might fail by reason of mining or quarrying operations in the vicinity, or it might become polluted. When there were any houses unoccupied, they would be getting no return; and the Corporation therefore thought that 20 years' purchase was enough. If the land could not be used for any other than agricultural purposes, then the question, was What was the value? If there was a restriction placed upon land by means of which they could not use it as fully as they would otherwise do, everybody knew that a purchaser would not give the same money for it. The point that the Umpire therefore had to determine was—Was this land, within a period that they could take into account, at all likely to be used for the purpose of building? If it was not, then it would be agreed that 20 per cent. was a fair figure. If it was thought it was, 20 per cent. would not be a fair figure.

Mr. FOOTE, replying on the whole case for the claimant, said he had no doubt that depreciation was a very important point, because while they claimed depreciation of £50 an acre they were allowed only £10 an acre; and, speaking roughly, this was a difference of between £250 and £1350 actually. Everybody agreed that if the land was building land at all 20 per cent. was an inadequate amount to take off it; and he also agreed that if it was not building land at all, the depreciation would be very much less. He submitted that it would sell for more than the agricultural value; and 20 per cent. on the agricultural value was not sufficient. There was on the land here an additional value in the auction-room; and this value would go in consequence of the restrictive covenant. As to the value of the water, and the cost of making the road, there was an ample margin on the scheme to return a reasonable amount. Either it should be said they were to have the water for nothing, or there should be a sum fixed which would fairly represent its value. The minimum average flow, of which the claimant had produced proper evidence, was 25 gallons a minute on gaugings taken in four winter months of the year. The Corporation evidence said it was 19 or 20 gallons a minute; and their attempt to reduce the amount was an extraordinarily unfair one.

At the close of the proceedings, the Umpire reserved his award.



The "Positive"

SAWER & PURVES
MANCHESTER &
NOTTINGHAM.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The Gas Committee of the Corporation of Glasgow yesterday resolved to recommend that the price of gas for lighting and domestic purposes be retained at 2s. 1d. per 1000 cubic feet within the city and suburbs, and at 3s. 1d. in the Milngavie area; but that it be reduced from 2s. to 1s. 9d. for motive power purposes, and from 2s. 1d. to 1s. 9d. for manufacturing purposes.

At the monthly meeting of the Edinburgh and Leith Gas Commissioners on Monday, Bailie Bryson, of Leith, who presided, reported that the Works Committee had considered tenders for the erection of carbonizing plant in the extension which is in progress at the Granton Gas-Works. These were seven in number. Four of them complied with the specifications; and they had been remitted to the Engineer to go over the schedules, and, if found in order, to accept the lowest offer. The Commissioners remitted to a Committee to consider the whole subject of the discounts allowed to consumers. The Treasurer (Mr. John S. Gibb) read the docket of the Auditor upon the year's accounts. With regard to these, the Finance and Law Committee reported that they had been found to be correct. They recommended that they be allowed and certified, and that there should be set apart for the annuities sinking fund, the mortgages sinking fund, and the reserve fund, the minimum contributions authorized—viz., £6981 15s. 1d., £10,434 2s. 9d., and £660 9s., or altogether £18,076 6s. 10d.; and that the balance of £21 2s. 1d. be carried to the current year's account. This was agreed to. It was reported to the Commissioners that they had sent in an offer for Craigleith Quarry. The offer has since been accepted. The quarry occupies a site extending to 15 acres. The Commissioners have acquired the property for £4000; their object in purchasing it is to get a supply of water for the Granton works.

That interesting body, the Sulphate of Ammonia Committee, held their eighth annual general meeting in the Board-room of the Edinburgh and Leith Gas Commissioners on Thursday. Their deliberations were presided over by Mr. T. Milne, of the Gaslight and Coke Company. At the close of the meeting the Committee were entertained to luncheon by the Gas Commissioners—Bailie Bryson, of Leith, occupying the chair. In the afternoon, a flying visit was made to the Granton Gas-Works, where Mr. W. R. Herring, the Engineer, showed the party round. The works are now looking splendid, all the earthwork having been smoothed down, and the place beautified by the planting of about 7000 trees and shrubs. The buildings there stand in quite sylvan surroundings. The whole place has an inviting appearance. The extension which is in progress will, it is expected, be completed in about a year. After leaving the works, the party drove to the Earl of Rosebery's home farm at Dalmeny. On entering the grounds, Mr. John Hunter, F.I.C., F.C.S., of Edinburgh, the Technical Adviser to the Sulphate of Ammonia Committee, informed the visitors that they would see the finest crops of potatoes in the world. This was fully realized; for as field after field of lovely potatoes, in full bloom, were passed, the general consensus of opinion expressed was that nothing finer could be seen anywhere. Mr. Hunter mentioned that the return from 100 acres of potatoes last year was £12,000; some of the varieties selling—for seed purposes—as high as 25s. a pound. The whole of the farm is manured with sulphate of ammonia. I have mentioned potatoes. The corn and the turnips were also very heavy crops; and the hay, which was cut, appeared to be the same. But the objective of the visit was the experimental plots which have been conducted under Mr. Hunter's supervision during the past ten years. For these about eight acres of land have been enclosed and subdivided into plots, for the most part one-fifth of an acre in extent. The crops grown are oats and pototoes. For the first four years experiments were tried with different manures, in all of which, it is almost needless to say, sulphate proved pre-eminent; then for four years the experiments were conducted with a view to working out the unexhausted manures; and now the only manure given is sulphate and ground lime shell. Some wonderful things were seen, including twenty new varieties of potatoes, for which names have yet to be found, and some of which would not be sold for less than £1000 per plant. There was also the plant which grows potatoes under the soil, but tomatoes above ground, which was a great curiosity. The station is visited by large bodies of people interested in agriculture. When the Committee were there, a party from Australia arrived, and went round making notes of what they saw. In the course of the visit, the suggestion was made that the experiments should take more the form of showing, by contrast, the beneficial effect of sulphate of ammonia upon crops. The subject is to be considered; but it may not be necessary to do what was suggested, because the whole farm is a most effective object-lesson as to the value of sulphate as a manure. It is safe to say that, in the farm and the plots together, the Committee saw much which must have impressed them.

It is reported from Perth that a difference of opinion has arisen between the Gas Committee of the Corporation and the Auditor, over the gas-stove account. It seems that the Auditor has required that a sum of £2500, which had been taken from capital and applied in the maintenance and repair of gas-stoves, should be taken out of the revenue for the past year, and replaced in the capital account. The Gas Committee have disapproved of the whole sum being taken from one year's revenue, and have suggested that the operation should be spread over a number of years. The Auditor's reply to the suggestion has not been received. There is said to be a large surplus on the year's working.

At the annual meeting of the Annan Gas Company last week, the Chairman (Mr. J. H. Foster) congratulated the shareholders upon the increase in the dividend from 5 to 6 per cent., and the consumers upon the prospect of a further reduction in price. During 1894, and down to the end of 1898, the price of gas was 4s. 2d. per 1000 cubic feet. In the two years which followed it was reduced to 3s. 6d. Then it was raised to 4s. for two years. In 1902-3 it was again reduced to 3s. 6d.; and last year to 3s. 4d., with the prospect of a reduction in October to

CARBURETTED WATER-GAS APPARATUS

Merrifield—Westcott—Pearson Patents.

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CARBURETTED WATER-GAS ENGINEERS.

The above Company have erected since 1893, or are now erecting, their Universal Type of Carburetted Water-Gas Plant at the following Gas-Works:—

	Cub. Ft. Daily.		Cub. Ft. Daily.		Cub. Ft. Daily.
BLACKBURN	1,250,000	ST. CATHERINES (Remodelled)	250,000	TONBRIDGE	300,000
WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	KINGSTON, PA.	125,000	STRETFORD	500,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	PETERBOROUGH, ONT.	250,000	OLDBURY	300,000
COLCHESTER	300,000	WILKESBARRE, PA.	750,000	TODMORDEN	500,000
BIRKENHEAD	2,250,000	ST. CATHERINES (2nd Cont.)	250,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
SWINDON (New Swindon Gas Co.)	120,000	BUFFALO, N.Y.	2,000,000	YORK (Second Contract)	750,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	WINNIPEG, MAN.	500,000	ROCHESTER (Second Contract)	500,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	COLCHESTER (Second Contract)	300,000	NEWPORT (MON.)	250,000
HALIFAX	1,000,000	YORK	750,000	TOKIO, JAPAN	1,000,000
TORONTO	250,000	ROCHESTER	500,000	PERNAMBUCO (Brazil)	125,000
OTTAWA	250,000	KINGSTON, ONT.	300,000	MALTON	150,000
LINDSAY (Remodelled)	125,000	CRYSTAL PALACE DISTRICT	2,000,000	DULUTH, MINN. (2nd Cont.)	300,000
MONTREAL	500,000	DULUTH, MINN.	300,000	BROCKVILLE (ONT.)	250,000
TORONTO (Second Contract Remodelled)	2,000,000	CATERHAM	150,000	SMETHWICK	500,000
BELLEVILLE	250,000	LEICESTER	2,000,000	GRAVESEND	300,000
OTTAWA (Second Contract)	250,000	ENSCHEDE (HOLLAND)	150,000	NEWPORT MON. (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000	BUENOS AYRES (RIVER PLATE CO.)	700,000	TORONTO (Third Contract)	750,000
		BURNLEY	1,500,000	TORONTO (Fourth Contract)	1,000,000
		KINGSTON-ON-THAMES	1,750,000	MONTREAL, ONT. (2nd Cont.	1,800,000
		ACCRINGTON	500,000	HAMILTON, ONT.	400,000

LEEDS, 1,800,000 C. Ft. LEICESTER (2nd Cont.), 1,000,000 C. Ft. NEWCASTLE-ON-TYNE, 1,800,000 C. Ft.

AND IN ADDITION, 7,900,000 CUBIC FEET DAILY; also Coal-Gas Plants at NELSON, B.C., CHATHAM, BERLIN, NAPANEE, OWEN SOUND, CALGARY, and WINNIPEG.

3s. 2d. The annual meeting of the Bo'ness Gas Company, Limited, was held on Monday. It was stated in the report of the Directors that the business is still advancing. Since a gas exhibition which was held in April, about 70 gas-stoves and over 150 rings have been put into use. The usual dividend of 5 per cent. was declared. At the annual meeting on Thursday of the Crieff Gas Company, it was reported that the income during the past year was £5067, and that there was a balance of profit of £1577. A dividend at the rate of 7½ per cent. was declared, £295 was applied in the writing off of preliminary and other expenses; and the balance of £395 was added to the reserve fund. The Manager (Mr. A. Napier) reported that the quantity of gas made during the year was 21,745,800 cubic feet, which was an increase of 1,485,700 cubic feet upon the preceding year. It was resolved to abolish the charge for the hire of cooking-stoves, and also to increase the discount allowed upon gas consumed in engines, when £10 worth of gas is taken in a year, from 2½ to 7½ per cent.

The Town Council of Alloa had before them at their meeting on Thursday the estimates for the current year, which have been prepared by Mr. J. W. Napier, the Manager. These bring out an expected surplus of £691. The Council resolved to retain the price of gas at 2s. 2d. per 1000 cubic feet, and tentatively fixed the price for power purposes at 2s. The output of gas during the current year is estimated to show an increase of 3 million cubic feet.

The Edinburgh and District Water Trust agreed on Thursday that the new water supply from the Talla be turned on upon Thursday, Sept. 28. The first sod of the works was cut on Sept. 28, 1895. Mr. Wood, the Convener of the Finance Committee, in moving approval of the accounts for the year ending May 15, said it was satisfactory that the actual income and expenditure varied so little from the estimated amounts. The estimate of income was £131,240, and the actual income was £132,910—an excess of £1670. The estimated expenditure was £133,493, and the actual, £134,005—an excess of £512. In the estimates a deficit of £2253 was anticipated, which was to be provided for by an existing balance of £3204 at the credit of the revenue account. They had still a surplus balance at credit of £2216, which was very satisfactory. There was expended on capital account during the year a sum of £126,388, of which £109 838 was on account of the Talla scheme. The total expenditure upon the scheme up to May 15 last had been £1,080,969. It would be interesting to note that the total expenditure of the Water Trust up till Whitsunday of this year had been: Paid to the Water Company, under the Act of 1869, £580,732; cost of the Moorfoot and other works authorized under the Act of 1874, £870,694; cost of the Talla water-works scheme—land, wayleave, compensation, commission, &c., £119,094; railway, £64,597; aqueducts, £659,259; reservoir, £236,183; and filters, £1746—£1,080,969. This made a total of £2,532,395. The mortgage debt of the Trust had increased since 1895 from £707,948 to £1,849,062—an increase of £1,141,114. Notwithstanding this very large expenditure, and extra expenditure under ordinary revenue charges, the increase on the rates had not been so great as might have been expected, as it was only in the last year that there had been an increase equal to 2d. in the pound on the domestic and public rates, which till May, 1904, were at the low figure of 6d. The accounts were adopted.

CURRENT SALES OF GAS PRODUCTS.

Week ending July 29.

There has been very little alteration in the London market for tar products during the week. Further considerable business has been done in pitch at between 29s. and 29s. 6d. per ton, and there seems no need whatever to consider a lower figure. 90 per cent. benzol may be still called 9½d. per gallon net, but it is hardly as firm as it was. Carbolic acid, 60's, is still between 1s. 9d. and 1s. 9½d. net. There are considerable inquiries in the market just now for crystal carbolic acid, which should keep this article firm. Sulphate of ammonia does not improve in price, but from £12 7s. 6d. to £12 8s. 9d. per ton on Beckton terms can be obtained for prompt.

Sulphate of Ammonia. LIVERPOOL, *July* 29.

There has been no recovery from the dulness which has characterized the market throughout the month. While supplies have all along been moderate, direct demand has been limited, and speculative contracts have been readily covered at gradually declining prices. The closing quotations are £12 5s. per ton f.o.b. Hull, and £12 7s. 6d. per ton f.o.b. Liverpool and Leith. Makers for the most part adhere to their quotations of £12 10s. and £12 12s. 6d. per ton, according to port, for delivery up to the end of the year and for October-March; but business has been done at £12 7s. 6d. per ton, and that about represents the ideas of buyers generally, though some are aiming at a lower level.

Nitrate of Soda.

This article is weak; and spot prices are 10s. and 10s. 3d. per cwt. for ordinary and refined qualities, respectively.

Tar Products. LONDON, *July* 29.

There has really been very little business doing during the past week, which, however, is not unusual at this time of year. In benzol the demand continues fairly good, and business is again reported at 9½d. f.o.b. London, although there are certainly sellers at 9d. in the North for early shipment. In 50-90 per cent. there is no further business to note, but the demand appears to be fairly good for August-September delivery. No actual business has taken place in toluol, but the price remains very firm at 8½d. for August-September. There is really very little offering, makers being fully sold for early delivery. The demand for solvent naphtha continues fairly good, but prices remain unchanged.

VALVES

OF ALL KINDS.

WECK'S PATENT VALVES.

MILBOURNE'S PATENT PURIFIER VALVES.

HOWELL'S PATENT DISCHARGE VALVES.

MILBOURNE OR CRIPPS' PATENT GRID VALVES.

INTERNAL RACK & DOUBLE-FACED VALVES.

C. & W. WALKER, Ltd.,

Midland Iron Works, DONNINGTON, near NEWPORT, SHROPSHIRE.

110, CANNON STREET, LONDON, E.C.

Telegraphic Addresses { FORTRESS DONNINGTON, SALOP. / FORTRESS LONDON.

There appears, however, to be a good inquiry for home consumption just at present. There is no business to report in anthracene, and consumers do not seem to take any interest in this article at present. Carbolic acid is slightly weaker all round, as makers show rather more desire to sell for forward delivery; while consumers report business at very low prices—one of the largest consumers on the Continent stating that he has actually done business at under 1s. 9d. for forward delivery. It is, however, difficult to trace the sellers, as makers certainly are not at present prepared to consider business upon any such terms. In crystals, the demand continues fairly good, but there is not very much business doing. The principal London makers still maintain their price in creosote at 1¾d., but a considerable quantity of inferior oil could be purchased at under this figure from the smaller makers. In the Yorkshire district sales have again been made at 1¼d. and 1⅜d. for delivery over the next three months; while in the Lancashire and Midland districts, the market is decidedly quiet, and there is no business to report. Pitch is, if anything, a trifle easier all round, and business is reported in South Wales for delivery all over next year at very low prices. There is a good deal offering in the Lancashire district for delivery over the next two to three months, but dealers only offer prices which do not tempt manufacturers to sell just at present. London makers still ask 29s.; but business is not possible at this price, at any rate for the present. As regards the Yorkshire makers, they do not appear to be offering anything for early delivery; probably they will not offer anything over next season until a little later in the year, when the large tar contracts are settled. In Belgium, consumers certainly appear to be well supplied over the present year, and seem only interested in the market over the first six months of next.

The average values during the week were: **Tar**, 16s. to 21s. **Pitch, London**, 28s. 6d. to 29s.; east coast, 28s. to 28s. 6d.; west coast, 25s. 6d. to 26s. **Benzol, 90 per cent.**, 9½d.; **50-90 per cent.**, 8½d. **Toluol**, 8½d. **Crude naphtha**, 3¼d.; **solvent naphtha**, 8¼d. to 8½d.; **heavy naphtha**, 10d. to 10½d. **Creosote, London**, 1 5/16d. to 1 11/16d.; North, 1¼d. to 1⅜d. **Heavy oils**, 2d. to 2 1/16d. **Carbolic acid, 60 per cent.**, 1s. 9d. **Refined naphthalene**, £4 to £8; **salts**, 12s. 6d. to 15s. **Anthracene**, "A" quality, 1½d. to 1¾d.; "B" quality, unsaleable.

Sulphate of Ammonia.

The market has been rather quiet during the past week, and prices are a trifle easier at the close. Beckton ask £12 10s. in any position; but probably they would be prepared to accept a little less than this, although it is generally believed that offers of £12 7s. 6d. have been declined for August-December. In Leith, makers ask £12 6s. 3d.; but it is reported that business has been done at £12 5s., although particulars as to this have not transpired. The market has been very quiet at Hull. Sales were made early in the week at £12 3s. 9d.; while £12 2s. 6d. is reported to have been accepted at the close for prompt delivery. The market in Liverpool is quiet, and there is not very much business to report.

COAL TRADE REPORTS.

Lancashire Coal Trade.

With a diminishing demand for house coal, there has been a better inquiry for engine fuel. Coke is also an improving trade. The demand for cannel, however, is of a spasmodic character so far as its requirements are concerned and very irregular in its delivery. Coal for shipping is slow but steady. Quotations are: Best house coal 13s. to 14s., medium 11s. 6d. to 12s. 6d., common 9s. to 10s., steam and forge 8s. to 9s, best engine 7s. 6d. to 8s. 6d.

Northern Coal Trade.

There is now more activity in the northern coal trade, and the demand is much fuller for some of the best classes of fuel. In steam coals, best Northumbrians are from 9s. 4½d. to 9s. 6d. per ton f.o.b., second-class steams are from 8s. 3d. to 8s. 6d., and steam smalls are firm at from 4s. 9d. to 5s. 6d. The steam coal collieries seem to be well employed, and one or two of the best have orders well booked ahead. Gas coal now begins to show a slow increase in the demand; for the deliveries are heavier, and there is the certainty of a continuance of the increase as the days shorten, so that the output of the collieries will be better taken up by the contracts. Good Durham gas coals vary in price from about 7s. 9d. to 8s. 6d. per ton f.o.b.; and for one or two of the very best kinds a higher price is asked. There are now some full contracts in the market—for Turin, Christiania, and other towns—and it is expected that the prices will be something like those now current. A few other sales for export over next season are now being negotiated; but sellers seem in some cases inclined to ask rather higher figures where coals are sold delivered. The coke market is firm; and this has had some influence on gas coke, which is in only limited supply. For good gas coke a current quotation is from 12s. to 12s. 6d. per ton, f.o.b. in the Tyne; but some shippers speak of lower figures.

Scotch Coal Trade.

On the resumption of work after the holidays it is found that the demand does not take up the whole of the, as yet, limited output. Consequently prices remain unaffected. The prices quoted are: Main 7s. 3d. to 7s. 6d. per ton f.o b. Glasgow, ell 8s. to 9s., and splint 8s. 6d. to 8s. 9d. The shipments for the week amounted to 145,146 tons—a decrease of 102,382 tons upon the previous week, and of 12,047 tons upon the corresponding week of last year. For the year to date, the total shipments have been 6,556,814 tons—an increase of 396,261 tons upon the same period of 1904.

Tenders for the issue of 1000 ordinary shares in the East Surrey Water Company, advertised in the "JOURNAL" on the 4th ult., were opened last Friday, and amounted to 5300 shares, at prices ranging from the minimum of £16 to £16 17s. 6d. per share. The average price per share obtained for the issue was £16 11s. 7d.

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12 YEARS'
EXPERIENCE IN
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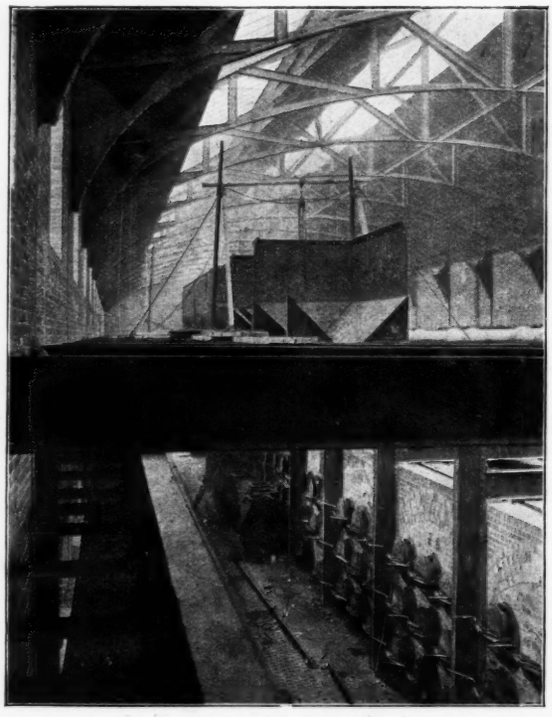

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PATENT
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AND
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Grit-Proof Bearings.

No Gas-Works is complete unless the above are in use.

NEW CONVEYOR Co., LTD., SMETHWICK.

Metropolitan Gas Company of Melbourne.—A cable has been received by the London agents for this Company stating that the profits for the half year to the 30th of June were £52,500. A dividend of 5s. per share has been declared for this period; a sum of £10,000 has been added to the reserve fund; and a balance of £2500 carried forward.

Totnes Public Lighting.—The Totnes Town Council have received tenders from the Totnes Electricity Supply Company, offering to light the public lamps at £2 each, or £2 12s. for Nernst lamps, for a ten years' contract, and from the Totnes Gas Company at £2 4s. for ordinary, and £2 9s. for incandescent lights. It was decided to accept the latter price, and offer the Gas Company a two years' contract if they would reduce the extra charge for the incandescent lights. One member remarked that this was the first time there had been competition; and the Town Clerk pointed out that the saving would be 4s. a lamp.

Cheaper Gas for Power Purposes at Leicester.—The Leicester Town Council last Tuesday had before them a recommendation of the Gas and Electric Lighting Committee that the price of gas used for power purposes should be reduced from 2s. to 1s. 6d. per 1000 cubic feet, as from June 30 last. Mr. Edwards, in moving the adoption of the proposal (which was carried), said there were 814 gas-engines in use in Leicester; and the consumption of gas for power purposes was 240 million cubic feet. Unless they reduced the price, they were in danger of many of the users seeking to get their power in other ways. It was estimated that the Committee would lose about £6000 by the reduction; but the falling off would be greater if they lost the customers they had, who took gas in the summer time when other users did not need it. He added that the Committee had saved £2000 on the coal contracts.

Proposed Uniform Charges for Water in London.—In accordance with the terms of the Metropolis Water Act, 1902, the Metropolitan Water Board have notified their intention of introducing next session a Bill providing for a uniform scale of charges applicable throughout the Board's limits of supply; and the matter has been reported upon by the General Purposes Committee of the Wandsworth Borough Council. They recommend the following resolutions for adoption by the Council: (1) That the basis of all domestic charges be the rateable value. (2) That there be an inclusive charge, embracing baths, high pressure, and water-closets. (3) That no water for domestic service be supplied by meter. (4) That hospitals and charitable institutions be not accorded any differential treatment. (5) That, having regard to section 15 (2) and (3) of the Metropolis Water Act, 1902, there should be no limit to the rate which the Water Board should be authorized to charge. (6) That there be one uniform rate for all rateable values up to £150, and a lower rate in respect of all rateable values exceeding £150—the higher rate to be charged on the first £150 of any rateable value. (7) That the Water Board should have power to make special arrangements with regard to large properties using very little water.

Montreal Gas Supply.—The situation of the gas supply at Montreal resembles very much that at Philadelphia. The contract between the Gas Company and the city expires in 1910; the charges being $1·20 for lighting and $1 for heating gas. The Councils offered a 15-year extension for a reduction in price; but the public would not agree to the proposal. Rumours are afloat in regard to outsiders putting in tenders; and municipal ownership is talked of.

Hoylake and West Kirby Gas and Water Company.—In the notice of the annual report and accounts of the Hoylake and West Kirby Gas and Water Company which appeared in last week's "JOURNAL" (p. 257), it was mentioned that "the total income, including the amounts brought forward, was £7785." It should have been stated that the total to the credit of profit and loss, including the amounts brought forward, was £7785. The total income (revenue) for the twelve months was £20,407.

Bradford and the Charge for Water to Drighlington.—The Drighlington Urban District Council have sent a deputation to the Bradford Corporation Water Committee to ask for a reduction in the price charged for the water furnished to them, on the ground that manufacturers in adjoining districts get their supply at a lower price than Drighlington. In reply, the Committee stated that the Bradford Corporation supply about forty places; that they have a uniform charge of 9d. per 1000 gallons; and that they cannot hold out any hope of a reduction being made.

Wiring Houses for Electricity at Manchester.—On the invitation of the Manchester Corporation Electricity Committee, a number of builders had a conference with them last week on the subject of the supply of current to house property in residential neighbourhoods generally. The price of the current is about to be reduced to 4½d. per unit; and the Committee therefore think there should be an increased demand for fittings in new property. The deputation agreed that the electric light was very satisfactory, but pointed out that the prime difficulty to be met was the cost of wiring, added to the fact that in so many houses gas must also be put in because of the call for cookers. It is said, however, that some practical suggestions were made, which it is believed will lead to an increased use of electricity.

The Water Shortage at Cork.—The Local Government Board having been asked by the Cork Corporation to hold a sworn inquiry into the state of affairs at the water-works, in view of the various breakdowns that have occurred recently, replied that, while anxious to assist the Corporation, they considered the matters complained of were more properly subjects for a police investigation; but if the Corporation could supply them with further information, to show that they were in a position to deal with the matter under section 101 of the Local Government Act, 1898, they would carry out the wishes of the Corporation, provided they were furnished with the full facts and names of officers and other persons in any way involved. The letter was considered very unsatisfactory; and ultimately it was referred to the Law Agent to report what action shou'd be taken.

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INCORPORATED BY ROYAL CHARTER 1773
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Agencies in all large Towns.

Wolverhampton Water Supply.—The annual report of the Water Committee of the Wolverhampton Town Council states that the net profit on the year's working amounts to £153. The revenue account shows a total income of £33,029, while the expenditure amounts to £21,780, leaving £11,249 to be carried to the net revenue account. A sum of £3910 has been paid in respect of loans, £5220 on new water-works capital, and £1784 to sinking fund.

Price of Gas at Brighouse.—The Brighouse Gas Committee having recommended that the discount allowed on prompt payment of gas accounts should be 5d. per 1000 cubic feet—the price to remain as at present, 2s. 11d.—an amendment was proposed on the matter coming before the Council to the effect that the discount should be 4d.; making the net price 2s. 7d. per 1000 cubic feet, as against the Committee's suggestion of 2s. 6d. It was contended that the additional 1d. discount would make the Gas Department a losing concern for the year; and this apparently was the opinion of the majority of members, as the amendment was carried.

Additional Plant for the Aldeburgh Gas-Works.—About two months ago, the Directors of the Aldeburgh Gas Company had a meeting to consider a report made to them by Mr. W. Methven, the Manager of the Beccles and Bungay Gas Companies, on the condition of the works. He recommended the provision of a meter and governor, and the erection of a new gasholder. The report was adopted, and Mr. Methven was appointed Engineer to the Company. He was commissioned to purchase the first-named appliances; and tenders for the holder were left for future consideration. The result is that its erection has been entrusted to Messrs. S. Cutler and Sons.

Torpoint Public Lighting.—At the meeting of the Torpoint District Council last Thursday, the Lighting Committee reported in favour of the acceptance of an offer from the Torpoint Gas Company to allow the Council 5 per cent. off the current rate for the supply of gas, provided the agreement already drafted was signed before the commencement of the lighting season. Mr. W. Goad moved the adoption of the report. Mr. W. J. Reynolds moved, as an amendment, that the contract be yearly. He said that in three years they would pay £300 or £400, and they already had 2½ per cent. on this sum. Therefore they were only offered 6d. in the pound in consideration of the three-year contract. Dr. Samuel seconded. On being put, however, it was lost, and the report was adopted.

Electric Light Troubles in Milan.—The Rome Correspondent of the "Financial News" reports that the shares of the Edison Company, who supply electric light and power to Milan, have experienced a serious slump in consequence of an affair which promises far-reaching developments. A few months ago a new cashier was appointed. On entering upon his duties, he received from his predecessor a parcel, supposed to contain securities to the value of about £80,000, which the members of the Board have to deposit, in accordance with the statutes. Shortly afterwards a Director resigned, and very naturally claimed his deposit back. Great was the astonishment of the cashier when he opened the parcel and discovered that it only contained blank paper. The first cashier, who had been for more than ten years in the service of the Company, was immediately arrested.

The Growth of Municipal Expenditure.—Lord Claud Hamilton, the Chairman of the Great Eastern Railway Company, is one of those who, like Lord Avebury, never loses an opportunity of raising his voice against the growth of municipal expenditure and the increased burdens it entails upon the ratepayers. At the meeting of the Company last Friday, when referring to the accounts for the past half year, he pointed out that the only item over which the Directors had no control was that of rates and taxes; and he expressed regret that their land agent estimated the increase under this head for the present half year at £5000. The amount paid in rates and taxes by the Company for the past six months was £154,000, and for the whole year a sum equal to more than 2 per cent. on the ordinary stock; and yet, although they had to meet this heavy taxation, they did not possess a single representative on the spending bodies. The remark was received, as well it might be, with cries of "Shame." He went on to say that the chief increases were, no doubt, due to the action of local bodies in the Metropolitan area. In country districts there was not the same extravagance shown; in fact, in some of them there had been a reduction in the rates. He thought the people of London were at last beginning to wake up to a sense of the danger which threatened them in the immediate future if a stop were not put to this ever-increasing expenditure. An organization, he was glad to learn, was to be started in the coming autumn to endeavour "to stem the tide," and to deal successfully with this question of the growing rates.

APPLICATIONS FOR LETTERS PATENT.

14,664.—Sylva, S., "Producing acetylene." July 17.
14,687.—Langhans, R., "Incandescing media." July 17.
14,690.—Clarke, C. A., and Rossiter, W., "Prepaid meters." July 17.
14,693-4-5-6.—Dresser, S. R., "Joints and couplings." July 17.
14,744.—Potter, J., "Gas-turbine." July 18.
14,755.—Hersey, M., Podmore, A. E., and Thomas, J., "Incandescent gas-burners." July 18.
14,806.—Delassue, J., "Gas-motors." July 18.
14,897.—Kelvin, Lord, Blakiston, R., Hope, W., and Richards, G. B., "Meters." July 19.
14,913.—Darwin, H., "Water-heater." July 20.
14,923.—Kissel, W., "Lighting gas-lamps." July 20.
14,960.—Léon, J. B., "Gas-meters." July 20.
14,980.—Ludbrook, S. W., "Retort discharger." July 21.
15,016.—Gratrix, S., Jun., and Brother, Ltd., and Brocklesby, H., "Gas-stoves," July 21.
15,065.—Arundel, H. B., and Higginson, J., Jun., "Supplying a uniform mixture of gas and air." July 21.

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INSTALLATIONS.

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New Pamphlet,
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Deepfields, near Bilston, Staffs.
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On Friday, the 21st ult., Mrs. Sarah Hughes, aged 82, was found lying unconscious in bed. There was a strong smell of gas in the house, and it was discovered that the tap of the gas-bracket was full on. The windows were at once opened, and, under medical treatment, the old lady revived. She succumbed, however, last Thursday.

The New Conveyor Company, Limited, are resetting three beds of inclined retorts at the Leek Gas-Works, two at Middleton, and three at Dudley. In the last-named case, the retorts have not been reset since they were started in 1900; and we are informed that, when they were examined, the bottom ones were found in such good order that it is anticipated they will not have to be taken out.

The extent to which electric light shares at Melton Mowbray are appreciated may be gathered from the fact that on Monday last week ten £5 shares in the Electric Light Company were offered by auction; and after the Auctioneer had laid stress on the advantages attending the holding of such shares, which he said had paid 2½ per cent. for the last two years and before long would be paying 10 per cent., no response was made to his request for an offer at par. He thereupon came down to almost vanishing-point—*i.e.*, £1 per share—which brought a rash bid of 10s. per share, which gradually crept up till 50s. was offered. At this figure the Auctioneer, being somewhat disgusted, withdrew the whole of the shares.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

BANK HOLIDAY.

In consequence of the BANK HOLIDAY (Aug. 7), Communications for the next issue of the "JOURNAL" and Orders respecting ADVERTISEMENTS should be received at the Office

NOT LATER than the FIRST POST ON SATURDAY.

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Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

WANTED, FOR SALE, CONTRACT, &c. ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

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TEACHER GAS MANUFACTURE CLASSES. Birmingham Municipal Technical School.
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LEADING STOKER. King's Lynn Gas Works.
SHOW-ROOM ATTENDANT. No. 4443.
WATER FITTER, &c. Bicester Water Department.

Situations Wanted.

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OUTDOOR INSPECTOR. No. 4442.

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Pupils.

IN GAS ENGINEERS. No. 4440.

Directorship. Gas Stove Trade. No. 4437.

Company Meetings.

BROMLEY CONSUMERS' GAS COMPANY. Bromley. Aug. 10. Six o'clock.
COMMERCIAL GAS COMPANY. Cannon Street Hotel. Aug. 17. Twelve o'clock.
SOUTH SUBURBAN GAS COMPANY. Albion Tavern. Aug. 11. Three o'clock.
TOTTENHAM AND EDMONTON GAS COMPANY. Offices. Aug. 19. 2.30 o'clock.

Stocks and Shares.

HASTINGS AND ST. LEONARDS GAS COMPANY. Aug. 31.

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TENDERS FOR

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ABERYSTWYTH GAS COMPANY. Tenders by Aug. 4.
SHEFFIELD GASLIGHT COMPANY. Tenders by Aug. 16.

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SELBY WATER DEPARTMENT. Tenders by Aug. 28.

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ABERYSTWYTH GAS COMPANY. Tenders by Aug. 4.

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SULPHATE PLANT—See Advt. in this week's issue.
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Address No. 4442, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS MANAGERS' SONS.

OPPORTUNITY offered to well Edu-
cated Youth to learn Modern Gas Engineering in all its branches in Contractors' Office having important Contracts. Would have full opportunity of learning the Designing and Erecting of all Gas Apparatus, including entirely new Works. Premium returned in Salary.
Address No. 4440, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS STOVE BUSINESS.

VACANCY occurs for Energetic Young
Gentleman as Director of private Company. Whole time required. Special knowledge of Gas Industry desirable.
Apply, fully, in confidence, to No. 4437, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

BIRMINGHAM MUNICIPAL TECHNICAL SCHOOL.

APPLICATIONS are invited for the post
of TEACHER of Evening Classes in GAS MANUFACTURE.
For Particulars and Form of Application, apply to the SECRETARY.
July 27, 1905.

WANTED, an experienced and capable
FOREMAN MAIN AND SERVICE LAYER.
Apply, by letter, stating Age, Experience, present or last Engagement, and Wages required, together with *copies* of Two recent Testimonials, to Mr. WILLIAM PARLBY, Engineer and Manager, Gas-Works, HEREFORD.

STOKER WANTED.

WANTED, a thoroughly competent
Young Man as LEADING STOKER, used to Scoop Charging, Regenerative Furnaces, Engine, and Boiler. Good character indispensable. Abstainer preferred. Minimum wage £2 per week.
Applications, stating Age, and where employed during past Five Years, with Two or Three References, to the MANAGER, Gas-Works, KINGS LYNN.

WATER-FITTER, capable of working
a small Pumping Plant driven with Gas-Engines, wanted by the Bicester Urban Council. The duties will include Pumping the Water, Laying Services, and Repairs to same.
Applications, stating Experience and Age, and when disengaged, with Two References, to be sent to me on or before the 5th of August next. Wages not exceeding 30s. per week.
E. F. TANNER,
Clerk to the Council.
Bicester, Oxon.

WANTED by the Whitehaven United
Gas Company, Limited, a GENERAL WORKING FOREMAN for a Works making about 55 Millions. Must understand Generator Furnaces, Manufacture of Sulphate of Ammonia, be capable of Taking Charge of the Works in the absence of the Manager, and be a reliable man. Total abstainer preferred. Salary £90 a Year.
Apply, by letter, stating Age, Experience, and enclosing Three Testimonials, to the SECRETARY OF THE COMPANY, 67, Lowther Street, WHITEHAVEN.

WANTED, a smart young man to act
as SHOW-ROOM ATTENDANT and CLERK. Wages, about 30s. per week.
Applications, stating Age and Experience, to be addressed to No. 4443, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TRAVELLERS wanted for Scotland,
North of England, and the Midlands. Good men wanted. Preference given to those having previous Experience and a Connection among buyers of Gas-Meters in their respective districts.
Apply, by letter, to No. 4427, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, Two Second-Hand Purifiers,
5 ft. by 5 ft. by 40 ft., with Valves, Connections, and Lifting Gear. Must be cheap and good. Also a 5-inch GOVERNOR, with Bye-Pass Valves complete.
Apply to W. METHVEN, Manager, Gas-Works, BECCLES.

FOR SALE—a 12 light Pressure In-
creaser by Suggs. In perfect Condition. Cost £25. What offers? Can be seen by appointment.
Address No. 4441, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

PURIFIERS (planed joints). Set of
Four 10-feet square, Modern Centre Valve, Complete and Perfect. Sides of Covers re-sheeted. Fixed at low price for prompt sale. Also other sizes and Apparatus.
FIRTH BLAKELEY & Co., Thornhill, DEWSBURY.

PIPES.

A QUANTITY of 6-inch and 9-inch
Socket PIPES and SPECIALS. Clean, Strong, and Perfect. About 30 Tons. Will accept £3 5s. per ton to clear.
FIRTH BLAKELEY & Co., Gas Engineers, DEWSBURY.

TO BE SOLD, Four Lengths of New Steel
Hydraulic Main, D-shaped, 18 in. by 18 in. by 9 ft. 6 in. long each, tops perforated for 6 Dip Pipes. Also 6-inch Ascension, Arch, and Dip Pipes to suit, ready for delivery.
Write the WRIGHT GAS PLANT MANUFACTURING COMPANY, LIMITED, 181, Queen Victoria Street, LONDON, E.C

GAS PLANT for Sale—I can always offer
NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters. Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

ABERYSTWYTH GAS COMPANY.

THE Directors invite Tenders for
Twelve Months' supply of GAS COAL, between 4000 and 5000 Tons.
Tenders to be sent in not later than the 4th of August next.
By order,
R. J. JONES, Secretary.
Aberystwyth, July 24, 1905.

THE Directors of the Aberystwyth Gas
Company are inviting TENDERS for their surplus TAR during the Year ending the 31st of July, 1906.
Tenders to be sent in not later than the 4th of August next.
By order,
R. J. JONES, Secretary.
Aberystwyth, July 24, 1905.

TENDERS FOR COAL.

THE Directors of the Sheffield United
Gaslight Company invite TENDERS for GAS COAL and NUTS, for delivery during the period ending June 30, 1906. The Tenders to state whether the Coal is screened or unscreened.
Tenders (Forms for which can be obtained on application) must be delivered to the undersigned not later than the first post on Wednesday, the 16th day of August.
The Directors reserve the right to take the whole or any portion of the quantity offered, and do not bind themselves to accept the lowest or any Tender.
HANBURY THOMAS,
General Manager and Secretary.
Commercial Street,
Sheffield, July 28, 1905.

SELBY URBAN DISTRICT COUNCIL.
NEW WATER-WORKS.

PUMPING MACHINERY.
CONTRACT No. 6.

TENDERS are hereby invited for the
Construction, Delivery, and Erection of Duplicate PUMPING MACHINERY in connection with the above Works, comprising Boilers, Triple-Expansion Engines, Surface Condensers, Force Pumps, Head Gear and Borehole Pumps, with a capacity equal to raising 32,000 gallons per hour under a head of 310 feet.
Copies of the Plans and Specifications will be supplied on application to the Engineers, Mr. Percy Griffith, M.Inst.C.E., 54, Parliament Street, Westminster, S.W., and Mr. Bruce McGregor Gray, Assoc.M.Inst.C.E., Council Offices, Selby, Yorkshire, on payment of £5, which will be returned to all Contractors who shall submit a *bonâ fide* Tender for the work on or before the 28th day of August, 1905.
Tenders must be made on the Form provided and delivered under seal to the undersigned by the date above named. Every Tender must state the periods required respectively for the delivery and the erection of the Machinery, also the guaranteed duty of the Engines.
The Council do not bind themselves to accept the lowest or any Tender.
By order of the Council,
(Signed) J. H. BANTOFT,
Clerk to the Urban District Council.
Council Offices, Selby,
Dated the 25th of July, 1905.

COMMERCIAL GAS COMPANY.

NOTICE is Hereby Given, that an
ORDINARY MEETING of the Commercial Gas Company will be holden at the Cannon Street Hotel, in the City of London, on Thursday, the 17th of August, 1905, at Twelve o'clock at noon, to receive the Directors' Report and the Accounts of the Company for the Half Year ended the 30th of June, 1905, and to declare a Dividend.
The STOCK TRANSFER BOOKS WILL BE CLOSED from the 4th to the 17th of August next, both days inclusive, and the Dividends will be paid on the 1st of September next to the holders of Stock registered at the date of the closing.
By order of the Board,
H. D. ELLIS,
Secretary.
Offices: Stepney,
July 26, 1905.

TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.

NOTICE is Hereby Given, that the
ANNUAL ORDINARY GENERAL MEETING of the Proprietors of this Company will be held at the Company's Chief Offices, 639, High Road, Tottenham, on Saturday, the 19th day of August next, at Half-past Two o'clock in the afternoon precisely, to receive the Report of the Directors and Statement of Accounts for the Half-Year ended the 30th of June, 1905; to declare a Dividend for the same period; to elect Two Directors and an Auditor for the ensuing year; and for the transaction of General Business.
The TRANSFER BOOKS WILL BE CLOSED for the CONSOLIDATED STOCKS from the 5th to the 21st day of August, both days inclusive.
By order of the Board,
JAMES RANDALL,
Secretary.
Chief Offices: 639, High Road,
Tottenham, July 21, 1905.

SOUTH SUBURBAN GAS COMPANY.

NOTICE is Hereby Given, that the
ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at the Albion Tavern, Aldersgate Street, London, E.C., on Friday, the 11th day of August, 1905, at Three o'clock in the afternoon precisely, to receive the Report of the Directors and Statement of Accounts for the Half Year ended June 30 last, to declare a Dividend for the same period, and for General Purposes.
The TRANSFER BOOKS WILL BE CLOSED from the 28th day of July until after the Meeting.
By order of the Board,
CHARLES M. OHREN,
Secretary.
Offices and Works:
Lower Sydenham, S.E.,
July 24, 1905.

BROMLEY GAS CONSUMERS' COMPANY.

NOTICE is Hereby Given, that the
ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the "Bell" Hotel, Bromley, Kent, on Thursday, the 10th day of August, 1905, at Six o'clock p.m. precisely, to receive the Report of the Directors, the Balance Sheet certified by the Auditors, to declare a Dividend, and to transact generally the business of a General Meeting.
The TRANSFER BOOKS WILL BE CLOSED from the 24th of July, to the 10th of August, 1905, both days inclusive.
By order of the Board.
HENRY W. AMOS,
Secretary.
Offices: 156, High Street,
Bromley, Kent, July 24, 1905.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to
notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.
Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at MR. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

HASTINGS AND ST. LEONARDS GAS COMPANY.

THE Directors of the above Company
Give Notice that they are offering £10,000 5 per cent. ADDITIONAL STOCK for SALE BY TENDER in multiples of £10, being part of the £250,000 Ordinary Capital authorized by the Company's Act of 1899. Up to the present time, £36,475 6s. 3d. (£30,000 Additional Stock and £6475 6s. 3d. premium on issue) of such Ordinary Capital has been issued.
The Stock, under the Sliding-Scale Clauses in the Company's Act and at the present price of gas charged to the consumer, is entitled to a dividend at the rate of £6 1s. per cent. per Annum.
The minimum price which the Directors will accept will be at the rate of 120 per cent. All Tenders must be sent to the Secretary on or before the 31st day of August next, and will be opened on the 3rd of September next.
Forms of Tender, and full Particulars showing the dates of payment for the Stock, and details of the present Capital of the Company, with the premium on issue, Particulars of the Insurance Fund, the balance of undivided profits in hand, and Particulars of the regular progressive increase of the Company's business can be obtained upon application to the Secretary.
A. E. YOUNG.
Secretary's Office,
1, Bank Buildings, Hastings.

Re H. GREENE & SONS, LTD. IN LIQUIDATION.

TO GAS ENGINEERS, MANUFACTURERS, IRONMONGERS, &c.

WEATHERALL & GREEN will Sell by AUCTION, at the Surrey Engineering Works, Blackfriars Road, on Wednesday, August 2, and following day, at One o'clock precisely, in lots, the whole of the valuable Modern Plant and Stock of the above well-known firm of Gas Engineers, comprising a large quantity of Brass, Copper, and other Gas-Brackets, Pendants, and Standards; Incandescent and other Burners and Mantles; Brass Cocks, Elbows, Bends, Unions, and other Fittings; Street Lamps and Lanterns, and Parts; a great variety of fancy and plain glass Shades and Globes; Gas Heating Stoves; Illumination Devices; a quantity of Sheet Lead, Lead and Compo. Piping, Iron Barrel and Bar Iron, Sheet Copper, Tin Plates, and Scrap Metal; also the Expensive Plant and Machinery, including a 4-Horse Power Smithfield Gas-Engine, by T. Green & Son; a Punching and Cutting Machine; Large Screw-Cutting and Turning Lathe; a smaller ditto, by Selig, Sonnenthal, & Co.; Drilling Machine, by J. Cohen & Co.; Shafting, Belting, Grindstone, Planing Machine, Circular Saw, Polishing Machine; a quantity of Tools and Benches; Office Furniture, Fixtures, and Fittings; 3 Safes. Brougham by Barker; Trolleys and Trucks; and a large variety of useful effects lotted to suit both private purchasers and the trade.

May be viewed day preceding Sale.

Catalogues of the AUCTIONEERS, 22, Chancery Lane, W.C. Telephone 555 Holborn.

ARMSTRONG'S

PATENT

CANDLE SAFETY LAMPS.

Are a great improvement on Oil, giving a good Light, requiring little or no Cleaning, and when once lighted no further attention is necessary. The Candles are made to burn 5, 7, or 9 hours.

48, MANCHESTER STREET, GRAY'S INN ROAD, W.C.

'BUFFALO' INJECTOR

Operated Entirely by One Handle

Class A lifts 24 ft.
Class B lifts 12 ft.

SEND FOR LIST.

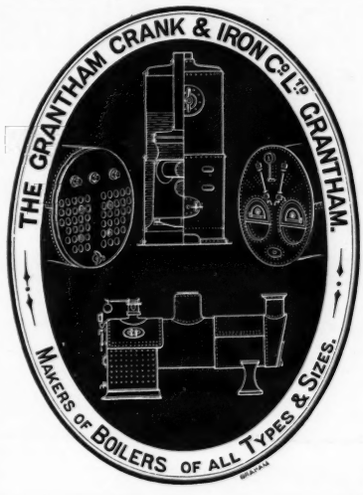
Telegrams: "Temperature London." Tel. No. 12,455 Central.

GREEN & BOULDING, — LIMITED, — **28, New Bridge St., LONDON, E.C.**

THOMAS DUXBURY & CO.,
16, DEANSGATE, MANCHESTER.

Best Gas Coal and Cannel, giving High Illuminating Power, Large Yield per ton, and reasonable in Price.

Telegrams: "DARWINIAN, MANCHESTER." Telephone 1806.



JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.

Manufacture and keep in Stock at their Works (also large Stock in London)

PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS, and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts, and Covers, and rendering Leakage impossible

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY,
LIMITED,
NEWBATTLE COLLIERIES,
DALKEITH, N.B.

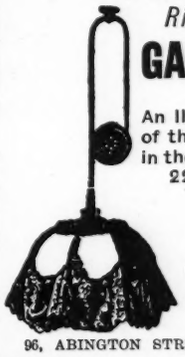
THE
"ROTARY"
STATION METER.

Efficiency Demonstrated.

APPLY—

T. G. MARSH,
MAWSON CHAMBERS, DEANSGATE, MANCHESTER.

THE "HANWELL" PATENT
Rising and Falling
GAS PENDANT



An Illustrated Description of this Pendant appeared in the "Journal" for Nov. 22, 1904 (page 599).

Write for full Particulars to the
"HANWELL" Pendant Company,
96, ABINGTON STREET, NORTHAMPTON.

S. S. STOTT & CO.,
ENGINEERS,
HASLINGDEN, nr. MANCHESTER.

LIME & OXIDE ELEVATORS & CONVEYORS.
COAL AND COKE STORAGE PLANTS.
Coal and Coke Elevators and Conveyors.
STAMPED AND RIVETTED STEEL ELEVATOR BUCKETS.
DETACHABLE CHAINS AND SPROCKET WHEELS.
HIGH-CLASS STEAM ENGINES. BEAM PUMPING-ENGINES, &c.

THOMAS BUGDEN,

India Rubber, Cuttapercha, Air-proof,

and . . Waterproof Manufacturer.

All Seams Stitched and Taped.

ORIGINAL MAKER OF
GAS BAGS FOR MAINS,
Round or Cylinder shape.

Diving and Wading Dresses, Gas Engine Bags, Sewer Boots, Tar Hose, Leather Machine Bands. Stokers' Mitts, Bellows, &c.

Contractors' & Miners' Woollen Jackets, Trousers, Hats, &c.

Sewer & Fireman's Boots.

116 & 118, GOSWELL RD., LONDON.

BOWENS' Ltd. Successors,
STOURBRIDGE.

MANUFACTURERS OF
BEST FIRE-BRICKS; INCLINED, HORIZONTAL, and SECTIONAL RETORTS; LUMPS, TILES, &c., of every description.
ESTABLISHED 1860.

Registered Offices Adjoining Lye Station, G.W. Railway.

Telegrams: "Harrison, Lye."

GEORGE K. HARRISON, LIMITED,
Proprietors of
STOURBRIDGE FIRE-CLAY MINES, BRICK WORKS, & COLLIERIES,
STOURBRIDGE.

Works, Collieries, and Mines:
BRETTELL LANE, NAGERSFIELD, and LYE.

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE LIMITED,
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.

Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.

SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

LONDON OFFICE: H. CRESSWELL & Co., LEADENHALL CHAMBERS, 4, ST. MARY AXE, E.C.

HEATHCOTE GAS COAL.

Rich in Illuminating Power and yield of Gas.

Above the Average in Weight and Quality of Coke.

Maintains a High Standard in Residuals.

THE GRASSMOOR CO., LD.,
CHESTERFIELD.

GILBERT LITTLE & CO.Y LTD.

Conveyor and Elevator Specialists,
Smethwick, Birmingham.

Make known your wants for Conveyors and Elevators to GILBERT LITTLE, the Pioneer Specialist: he will supply them.

THOMAS TURTON AND SONS, LIMITED,
SHEAF WORKS, SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS.
STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES, SPANNERS, RATCHET BRACES, LIFTING JACKS, ANVILS, VICES, AND ENGINEERS' TOOLS GENERALLY.
LONDON OFFICE:
90, CANNON STREET, E.C.

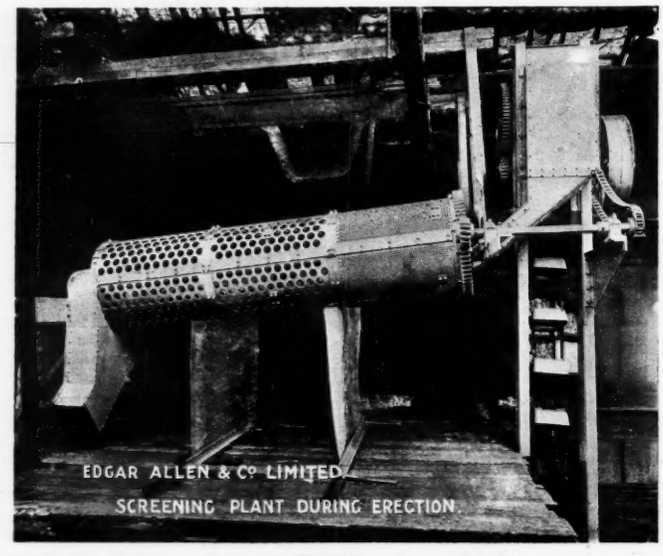
Gas Companies are solicited to try Samples of the
MIRFIELD GAS COAL
UNEQUALLED.
Sperm Value 878·85 lbs. per Ton

Prices and analysis on application.

The MIRFIELD (GAS-COAL) COLLIERIES CO.,
RAVENSTHORPE, NEAR DEWSBURY.

JOHN HALL & CO.,
STOURBRIDGE,
Manufacturers of
FIRE-BRICKS, LUMPS, TILES,
GAS RETORTS,
And every description of Fire-Clay Goods.

RETORTS CAREFULLY PACKED FOR SHIPMENT.



PULVERIZING,
GRINDING,
SEPARATING,
STORING,
WASHING AND DRYING MACHINERY,
For all Classes of Material

Coal & Coke Handling Plants.

TOOL STEEL, FILES, &c.

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EDGAR ALLEN & CO., LD., IMPERIAL STEEL WORKS, SHEFFIELD.

THE LEEDS FIRECLAY CO., LTD.,

CLIFF'S BRAND.
INGHAM'S BRAND.

Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

Patent MACHINE-MADE RETORTS

These Patent Machine-Made Retorts possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made. *Retorts carefully Packed for Export.*

LONDON: 2 & 3, NORFOLK STREET, STRAND, W.C.
LEEDS: 20, Park Row. LIVERPOOL: 21, Leeds Street.

COAL TAR PRODUCTS.

Benzol, Toluol, Solvent Naphtha, Creosote Oils, Grease Oils, Carbolic Acid, Crude Creosote Salts, Granulated (Crude) Naphthalene, Sublimed Naphthalene, Anthracene, Refined Tar, Pitch, also Sulphate of Ammonia.

For Prices apply to the **SOUTH METROPOLITAN GAS COMPANY**

Works: ORDNANCE WHARF, EAST GREENWICH, LONDON, S.E.

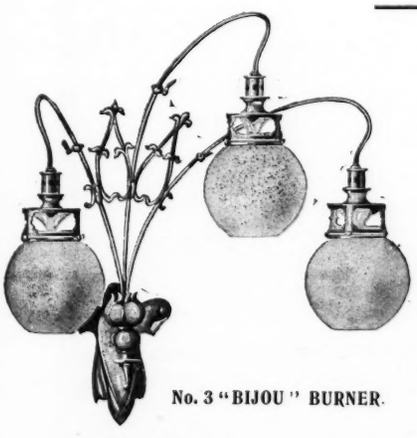
709, OLD KENT ROAD, LONDON, S.E.

Telegraphic Address: "METROGAS, LONDON."

THE

ORIGINAL NEW INVERTED BURNERS.

The "BIJOU" BURNER is the neatest, most decorative, and economical ever known, and is the real rival to Electric Light at One-Tenth the cost.



No. 3 "BIJOU" BURNER.

All Mantles we supply are made of best double-woven Ramie, and marked with our Trade Mark,

"NICO."

No. 2 BURNER.

INVERTED FITTINGS OF EVERY DESCRIPTION AND UP-TO-DATE DESIGNS.

The New Inverted Incandescent Gas Lamp Co., Ld.

23, FARRINGDON AVENUE, LONDON, E.C.

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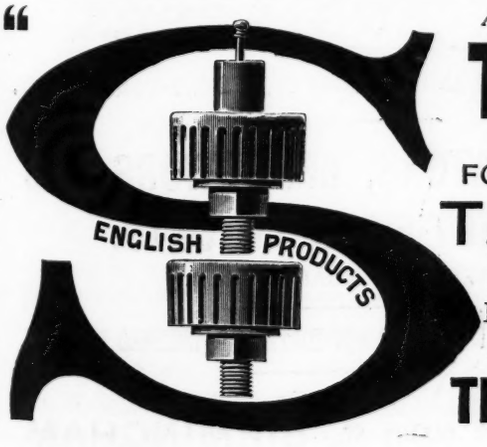


A BOON TO MASTER, MAN, and MACHINE.

TAUFFER'S LUBRICANT"

REG. TRADE MARK.

CENTIGRADE FOR HOT PLACES

TANDARD MACHINE GREASE.

AVING UP TO 90 PER CENT. OVER LIQUID OIL.

Patent "Unbreakable" & "Telltale" Stauffer Lubricators.

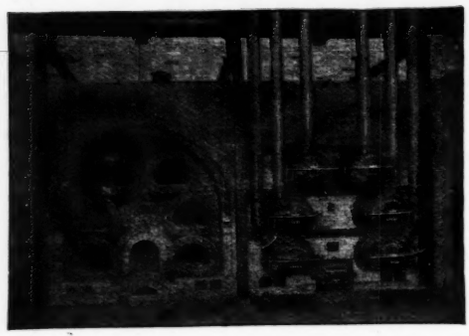
SOLE MAKERS—

TRIER BROS., 1, GT. GEORGE ST., WESTMINSTER, LONDON.

CUMBERLAND WORKS, NEW CHURCH RD., CAMBERWELL

F. C. SUGDEN & Co.

CARBONIZING SPECIALISTS.



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REGENERATOR & GENERATOR SETTINGS

DEEP, SEMI-DEEP, AND SHALLOW.

Maximum Make per Ton and Mouthpiece.

Minimum Fuel Consumption.

NUMEROUS REPEAT ORDERS

Have been received for each of the above types of Settings.

RESULTS GUARANTEED. RETORTS RESET.

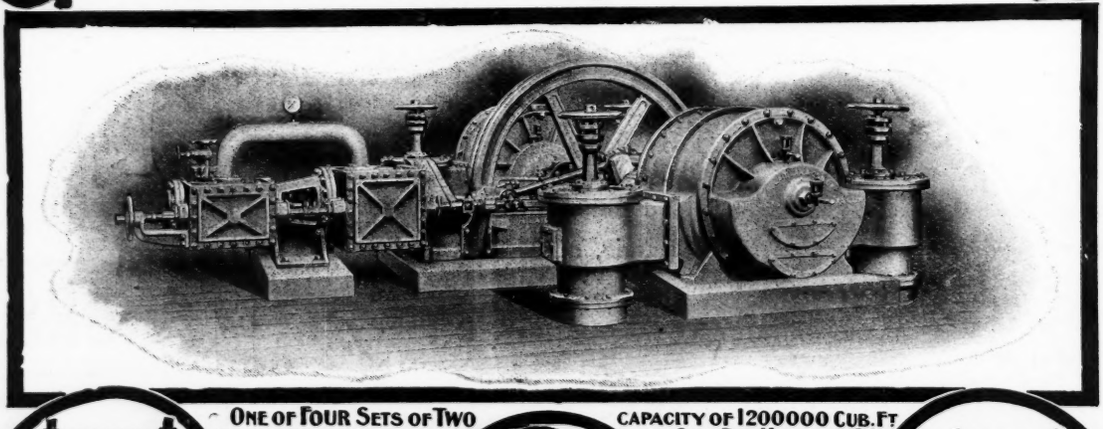
SOLE MAKERS OF **CRIPPS' PATENT CHIMNEY.**

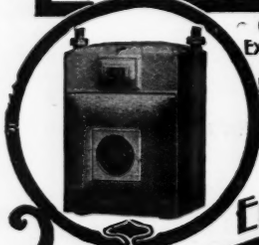
Designs and Estimates on application.

28, EAST PARADE, **LEEDS.**

R. LAIDLAW & SON, LIMITED

GAS & WATER ENGINEERS,



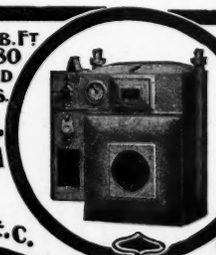


ONE OF FOUR SETS OF TWO EXHAUSTERS & HORIZONTAL TANDEM COMPOUND NON-CONDENSING STEAM ENGINE HAVING A TOTAL

SIMON SQUARE WORKS, EDINBURGH

CAPACITY OF 1200000 CUB. FT OF GAS PER HOUR AT 80 REVS PER MIN. ERECTED AT NECHELLS GAS WKS. BIRMINGHAM.

6 LITTLE BUSH LANE, LONDON, E.C.



ALLIANCE FOUNDRY & GLASGOW ENGINEERING WORKS,

GAS ENGINEERS.

CONTRACTORS FOR, AND ERECTORS OF, ALL GAS-WORKS PLANT.

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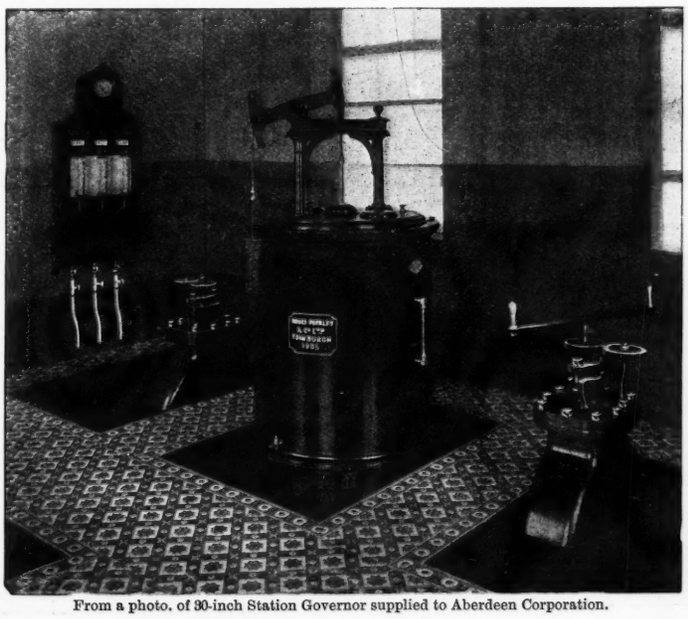
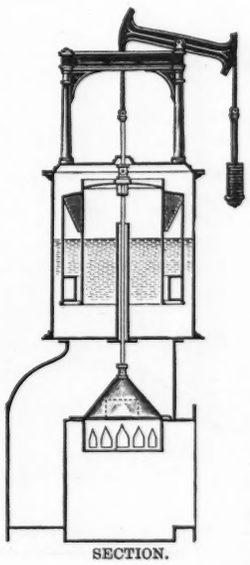


From a photo. of 30-inch Station Governor supplied to Aberdeen Corporation.



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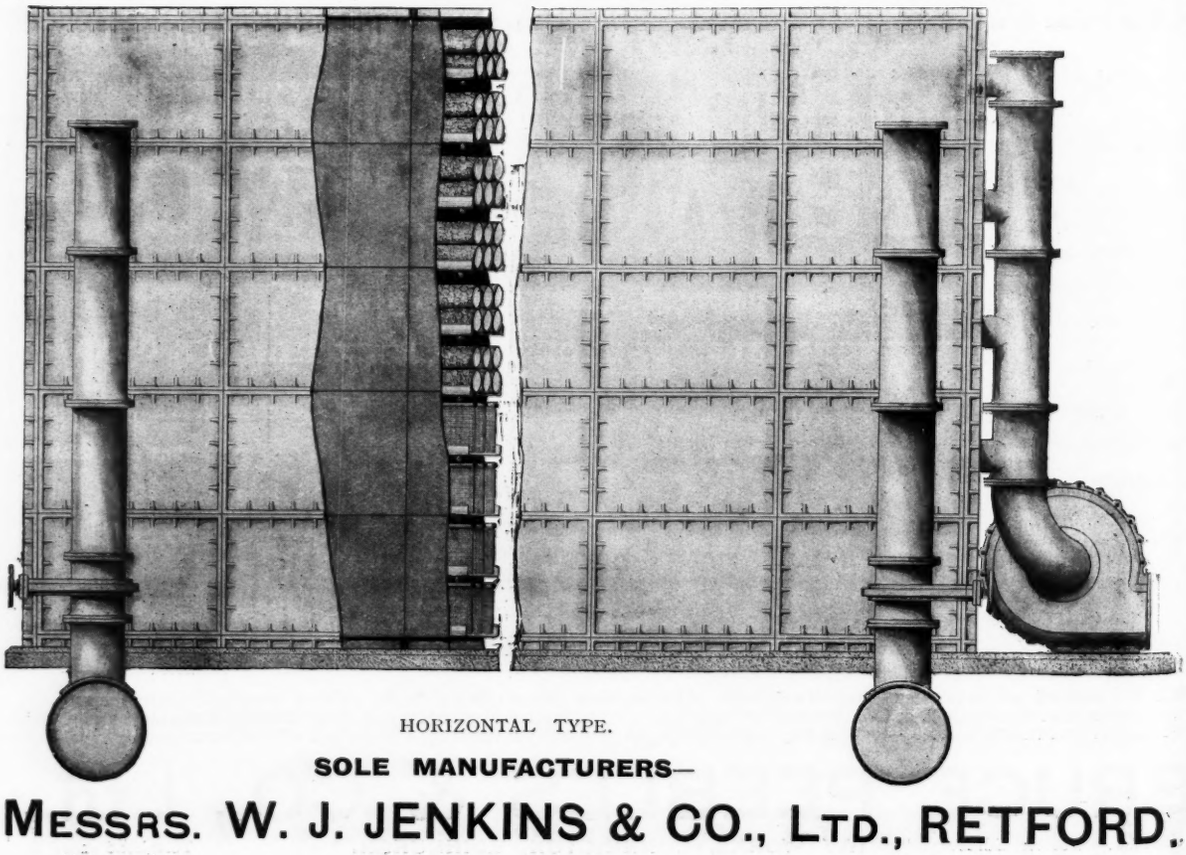

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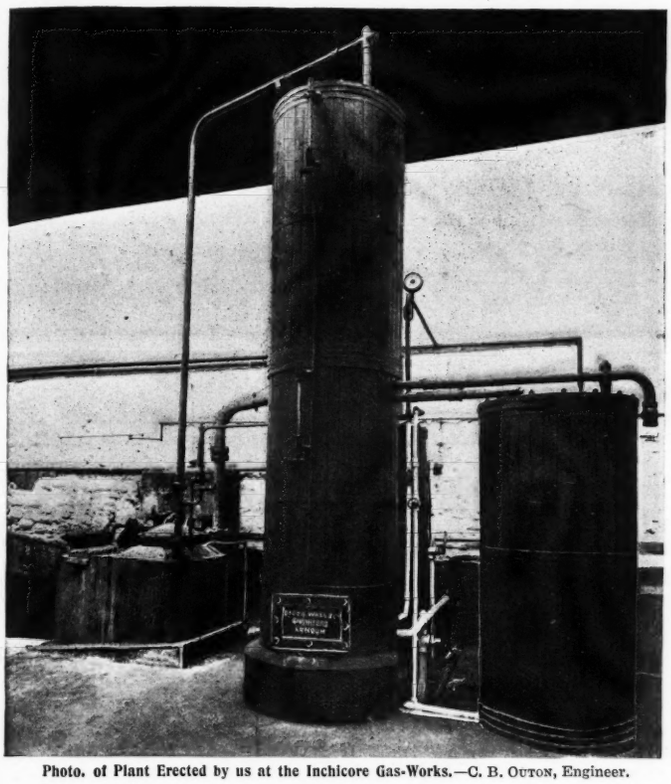

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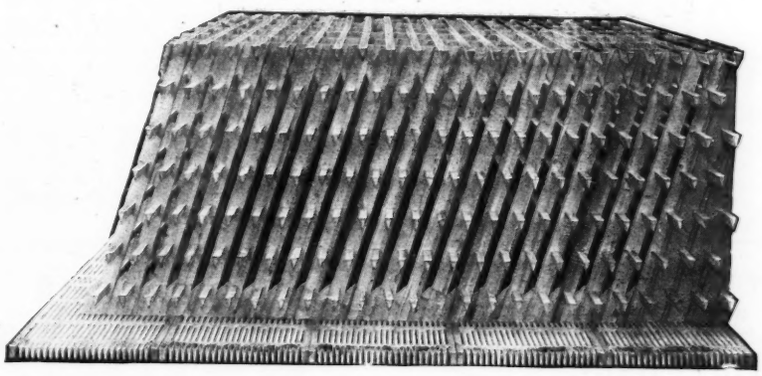

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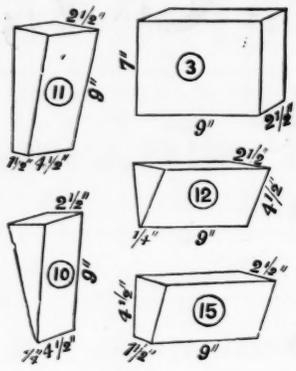

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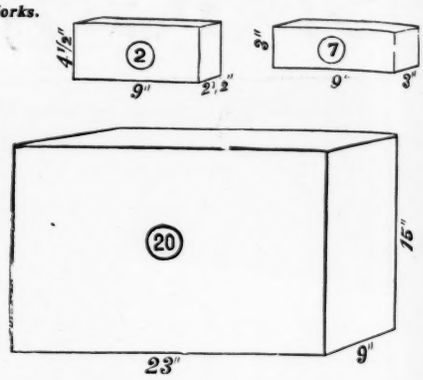

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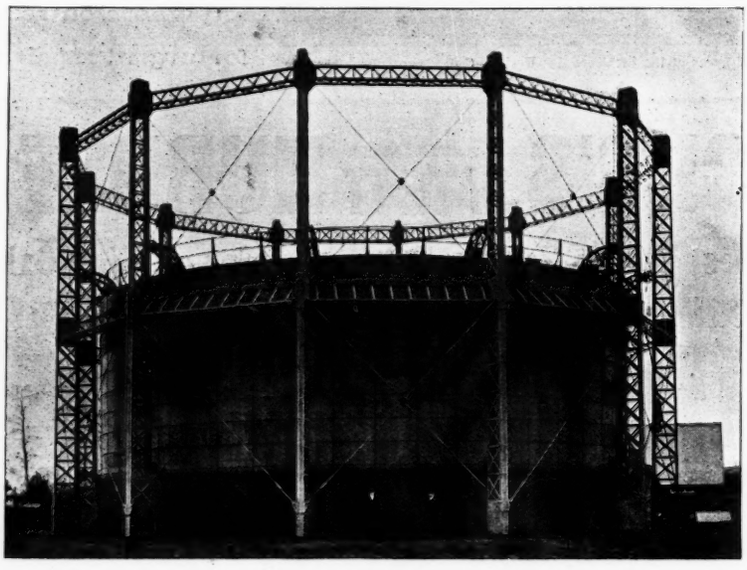

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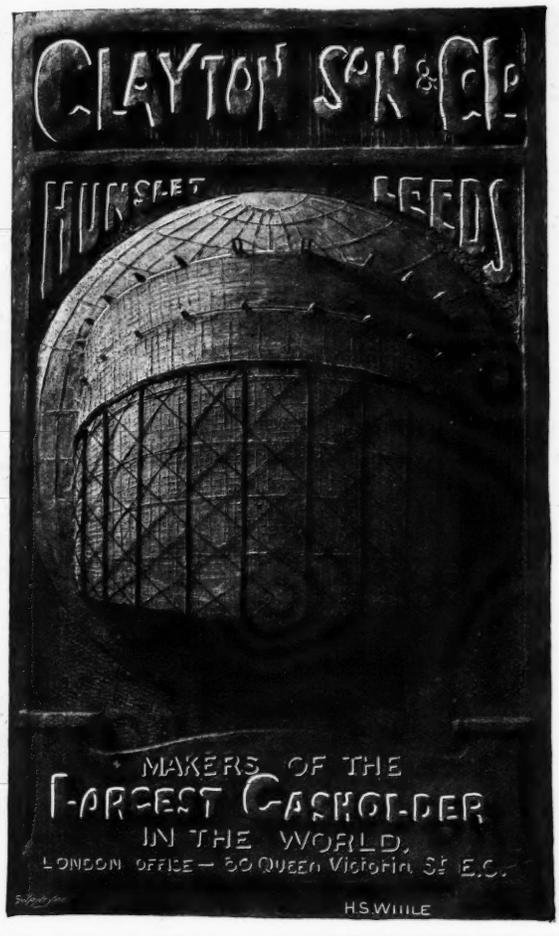

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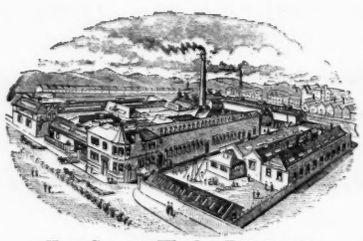

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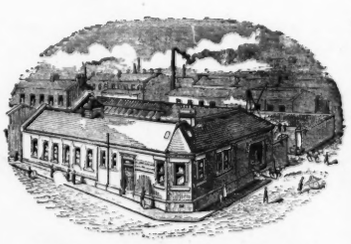

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Printed for WALTER KING by King, Sell, & Olding, Ltd.; and published by him at 11, BOLT COURT, FLEET STREET, in the CITY OF LONDON.—Tuesday, Aug. 1, 1905.